

**Strictly Confidential: (For Internal and Restricted use only)**  
**Senior School Certificate Examination**  
**September 2020**  
**Marking Scheme - Computer Science (NEW) (SUBJECT CODE: 083)**  
**(SERIES: HMJ/C, PAPER CODE - 91/C, SET 4)**

**General Instructions:**

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and the teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully. **Evaluation is a 10 -12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on the latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled.
5. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.
6. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
7. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
8. A full scale of marks **70** (example: **1-70**) has to be used. Please do not hesitate to award full marks if the answer deserves it.
9. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 25 answer books per day.
10. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
  - a. Leaving the answer or part thereof unassessed in an answer book.
  - b. Giving more marks for an answer than assigned to it.
  - c. Wrong transfer of marks from the inside pages of the answer book to the title page.
  - d. Wrong question wise totaling on the title page.
  - e. Wrong totaling of marks of the two columns on the title page.
  - f. Wrong grand total.
  - g. Marks in words and figures not tallying.
  - h. Wrong transfer of marks from the answer book to online award list.
  - i. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
  - j. Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
11. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as (X) and awarded zero (0) Marks.
12. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
13. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
14. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

15. The Board permits candidates to obtain a photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

**Specific Instructions:**

- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, the number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

<b>SECTION A</b>				
<b>Q 1</b>	<b>(a)</b>	Which of the following is <b>not</b> a valid variable name in Python. Justify reason for it not being a valid name: (i) <b>5Radius</b> (ii) <b>Radius_</b> (iii) <b>_Radius</b> (iv) <b>Radius</b>		[1]
	<b>Ans</b>	(i) <b>5Radius</b>  Reason: variable name in Python cannot start with a digit		
		(½ <i>Mark for writing correct option</i> ) (½ <i>Mark for writing correct reason</i> )		
	<b>(b)</b>	Which of the following are keywords in Python: (i) <b>break</b> (ii) <b>check</b> (iii) <b>range</b> (iv) <b>while</b>		[1]
	<b>Ans</b>	(i) <b>break</b> (iii) <b>range</b> (iv) <b>while</b>  Any two options out of (i), (iii), (iv)		
		(½ <i>Mark for writing each correct option</i> )		
	<b>(c)</b>	Name the Python Library modules which need to be imported to invoke the following functions:		[1]
		(i) <b>cos()</b> (ii) <b>randint()</b>		
	<b>Ans</b>	(i) <b>math</b> (ii) <b>random</b>  (½ <i>Mark for writing each correct Python Library Module name</i> )		
	<b>(d)</b>	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.		[2]
		<pre>input('Enter a word',W) if W = 'Hello'     print('Ok') else:     print('Not Ok')</pre>		

	Ans	<pre> W=input('Enter a word') //Error 1 if W == 'Hello' :           //Error 2, Error 3     print('Ok') else :                      //Error 4     print('Not Ok') </pre> <p>(½ Marks for writing correction for Error 1)  (½ Marks for writing correction for Error 2)  (½ Marks for writing correction for Error 3)  (½ Marks for writing correction for Error 4)</p> <p><b>NOTE:</b>  <i>(1 mark for only identifying all the errors without writing corrections)</i></p>	
	(e)	Find and write the output of the following python code:	[2]
		<pre> def ChangeVal(M,N) :     for i in range(N) :         if M[i]%5 == 0 :             M[i] //= 5         if M[i]%3 == 0 :             M[i] //= 3  L=[ 25,8,75,12] ChangeVal(L,4) for i in L :     print(i, end='#') </pre>	
	Ans	5#8#5#4#	
		<p>(½ Mark for writing each correct value)  <b>OR</b>  <i>(Only ½ Mark for writing all ‘#’ at proper places)</i></p> <p><b>Note:</b>  • Deduct only ½ Mark for not considering any or all correct placements of #</p>	
	(f)	Find and write the output of the following python code:	[3]
		<pre> def Call(P=40,Q=20) :     P=P+Q     Q=P-Q     print(P,'@',Q)     return P  R=200 S=100 R=Call(R,S) print (R,'@',S) S=Call(S) print(R,'@',S) </pre>	
	Ans	300 @ 200 300 @ 100 120 @ 100 300 @ 120	

		<p><i>(1½ Mark for writing each correct 2 lines of output)</i></p> <p><b>NOTE:</b></p> <p><b>Deduct only ½ Mark for not considering any or all line break</b></p>					
	(g)	What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum and maximum values that can be assigned to the variable End .	[2]				
		<pre>import random Colours = ["VIOLET", "INDIGO", "BLUE", "GREEN",            "YELLOW", "ORANGE", "RED"] End = randrange(2)+3 Begin = randrange(End)+1 for i in range(Begin,End):     print(Colours[i],end="&amp;")</pre> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">(i) INDIGO&amp;BLUE&amp;GREEN&amp;</td><td style="padding: 2px;">(ii) VIOLET&amp;INDIGO&amp;BLUE&amp;</td></tr> <tr> <td style="padding: 2px;">(iii) BLUE&amp;GREEN&amp;YELLOW&amp;</td><td style="padding: 2px;">(iv) GREEN&amp;YELLOW&amp;ORANGE&amp;</td></tr> </table>	(i) INDIGO&BLUE&GREEN&	(ii) VIOLET&INDIGO&BLUE&	(iii) BLUE&GREEN&YELLOW&	(iv) GREEN&YELLOW&ORANGE&	
(i) INDIGO&BLUE&GREEN&	(ii) VIOLET&INDIGO&BLUE&						
(iii) BLUE&GREEN&YELLOW&	(iv) GREEN&YELLOW&ORANGE&						
	Ans	<p>(i) INDIGO&amp;BLUE&amp;GREEN&amp;  <i>Minimum Value of End = 3</i>  <i>Maximum Value of End = 4</i></p>					
		<p><i>(1 Mark for writing correct option)</i>  <i>(½ Mark for writing Minimum Value of Stop)</i>  <i>(½ Mark for writing Maximum Value of Stop)</i></p>					
Q 2	(a)	Write the names of the immutable data objects from the following: (i) List    (ii) Tuple    (iii) String    (iv) Dictionary	[1]				
	Ans	(ii) Tuple    (iii) String <i>(½ Mark for writing each correct option)</i>					
	(b)	Write a Python statement to declare a Dictionary named ClassRoll with Keys as 1,2,3 and corresponding values as 'Reena', 'Rakesh', 'Zareen' respectively.	[1]				
	Ans	ClassRoll = {1:"Reena", 2:"Rakesh", 3:"Zareen"}					
		<i>(1 Mark for writing correct declaration statement)</i>					
	(c)	Which of the option out of (i) to (iv) is the correct data type for the variable vowels as defined in the following Python statement:	[1]				
		<pre>Vowels = ('A', 'E', 'I', 'O', 'U')</pre> (i) List    (ii) Dictionary    (iii) Tuple    (iv) Array					
	Ans	(iii) Tuple <i>(1 Mark for writing correct option)</i>					
	(d)	Write the output of the following Python code:	[1]				
		<pre>for i in range(2,7,2):     print(i * '\$')</pre>					
	Ans	\$\$ \$\$\$\$ \$\$\$\$\$					

		<i>(1 Mark for writing correct output)</i>											
(e)	Write the output of the following Python code:	[1]											
	<pre>def Update(X=10):     X += 15     print( 'X = ', X) X=20 Update() print( 'X = ', X)</pre>												
Ans	<b>X = 25</b> <b>X = 20</b>												
	<i>(½ Mark for writing each correct line of output)</i>												
(f)	Differentiate between “w” and “r” file modes used in Python while opening a data file. Illustrate the difference using suitable examples.	[2]											
Ans	<p>A file is opened using “w” mode to write content into the file.  A file is opened using “r” mode to read content into the file.</p> <p><b>Example:</b></p> <pre>def Create():     file=open('NOTES.TXT','w')     S="This is a sample"     file.write(S)     file.close()  def Read():     file=open('NOTES.TXT','r')     Lines=file.readline();     print(Lines)     file.close()  Create(); Read();</pre>												
	<i>(½ Mark for writing correct usage of 'w' mode)</i>												
	<i>(½ Mark for writing correct usage of 'r' mode)</i>												
(g)	A pie chart is to be drawn(using pyplot) to represent Pollution Level of Cities. Write appropriate statements in Python to provide labels for the pie slices as the names of the Cities and the size of each pie slice representing the corresponding Pollution of the Cities as per the following table:	[2]											
	<table border="1"> <thead> <tr> <th>Cities</th> <th>Pollution</th> </tr> </thead> <tbody> <tr> <td>Mumbai</td> <td>350</td> </tr> <tr> <td>Delhi</td> <td>475</td> </tr> <tr> <td>Chennai</td> <td>315</td> </tr> <tr> <td>Bangalore</td> <td>390</td> </tr> </tbody> </table>	Cities	Pollution	Mumbai	350	Delhi	475	Chennai	315	Bangalore	390		
Cities	Pollution												
Mumbai	350												
Delhi	475												
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Ans	<pre>import matplotlib.pyplot as plt Cities = ['Mumbai','Delhi','Chennai','Bangalore'] Pollution = [350,475,315,390] plt.pie(Pollution, labels=Cities) plt.show()</pre>												
	<i>(1 Mark for writing correct import statement)</i>												

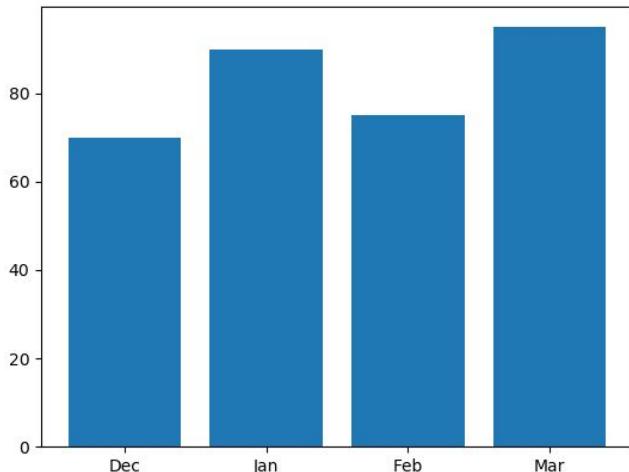
*(1 Mark for writing plt.pie statement with correct parameters)*

OR

Write the output from the given python code:

```
import matplotlib.pyplot as plt
Months = ['Dec', 'Jan', 'Feb', 'Mar']
Attendance = [70, 90, 75, 95]
plt.bar(Months, Attendance)
plt.show()
```

Ans



*(½ Mark for writing correct Labels of X axis)*

*(½ Mark for writing correct scaling of Y axis)*

*(1 Mark for drawing all the 4 bars correctly)*

- (h) Write a function `Show_words()` in python to read the content of a text file '`NOTES.TXT`' and display the entire content in capital letters. Example, if the file contains:

`"This is a test file"`

Then the function should display the output as:

`THIS IS A TEST FILE`

[2]

Ans

```
def Show_words():
    file=open('NOTES.TXT','r')
    Lines = file.readlines()
    for L in Lines:
        print(L.upper())
    file.close()
```

*(½ Mark for correctly opening the file)*

*(½ Mark for reading all lines)*

*(½ Mark for correct loop to iterate for each line)*

*(½ Mark for displaying each line in uppercase)*

OR

Write a function `Show_words()` in python to read the content of a text file '`NOTES.TXT`' and display only such lines of the file which have exactly 5 words in them. Example, if the file contains:

`"This is a sample file.`

`The file contains many sentences.`

`But need only sentences which have only 5 words."`

Then the function should display the output as:

`This is a sample file.`

		The file contains many sentences.	
	Ans	<pre>def Show_words():     file=open('NOTES.TXT','r')     Lines = file.readlines()      for L in Lines:         W=L.split()         if (len(W)==5):             print(L)     file.close()</pre> <p>(½ Mark for correctly opening the file)  (½ Mark for reading all lines)  (½ Mark for correct loop to iterate for each line)  (½ Mark for displaying each line having 5 words in it)</p>	
	(i)	Write a Recursive function in Python RecsumNat(N), to return the sum of the first N natural numbers. For example, if N is 10 then the function should return ( $1 + 2 + 3 + \dots + 10 = 55$ ).	[3]
	Ans	<pre>def RecsumNat(N):     if N==1:         return N     else:         return N+RecsumNat(N-1)</pre> <p>(1 Mark for checking the recursion termination condition)  (1 Mark for returning correct value on recursion termination)  (1 Mark for returning correct value on recursion)</p>	
		OR	
		Write a Recursive function in Python Power(X,N), to return the result of X raised to the power N where X and N are non-negative integers. For example, if X is 5 and N is 3 then the function should return the result of $(5)^3$ i.e. 125	
	Ans	<pre>def Power(X,N):     if N==1:         return X     else:         return X*Power(X,N-1)</pre> <p>(1 Mark for checking the recursion termination condition)  (1 Mark for returning correct value on recursion termination)  (1 Mark for returning correct value on recursion)</p>	
	(j)	Write functions in Python for PushS(List) and for PopS(List) for performing Push and Pop operations with a stack of List containing integers.	[4]
	Ans	<pre>def PushS(List):     N=int(input("Enter integer"))     List.append(N)  def PopS(List):     if (List==[]):         print("Stack empty")     else:         print ("Deleted integer :",List.pop())</pre>	

		<p>(½ Mark for writing correct PushS() header)  (½ Mark for writing correct input for integer)  (½ Mark for adding the entered integer into the List)  (½ Mark for writing correct PopS() header)  (½ Mark for checking empty list condition)  (½ Mark for displaying “Stack empty”)  (1 Mark for displaying and deleting value from the list)</p>	
		OR	
		Write functions in Python for InsertQ(Names) and for RemoveQ(Names) for performing insertion and removal operations with a queue of List which contains names of students.	
Ans		<pre>def InsertQ(Names) :     Name=input("enter Name to be inserted: ")     List.append(Name)  def DeleteQ(Names) :     if (Names==[]):         print("Queue empty")     else:         print ("Deleted integer is: ",Names[0])         del(Names[0])</pre>	

(½ Mark for writing correct InsertQ header)  
(½ Mark for accepting a name from user)  
(½ Mark for adding the entered name in the List)  
(½ Mark for writing correct DeleteQ header)  
(½ Mark for checking empty queue condition)  
(½ Mark for displaying “Queue empty”)  
(½ Mark for displaying the name to be deleted)  
(½ Mark for deleting name from the List)

### SECTION B

Q 3	Questions 3 (a) to 3 (d): Fill in the blanks:	
(a)	Computers connected by a network across different cities is an example of _____.	[1]
Ans	MAN or Metropolitan Area Network	
	(1 mark for writing the correct missing word)	
(b)	_____ is a network tool used to test the download and upload broadband speed.	[1]
Ans	Speedtest	
	(1 mark for writing the correct missing word)	
(c)	A _____ is networking device that connects computers in a network by using packet switching to receive, and forward data to the destination	[1]
Ans	Switch	
	(1 mark for writing the correct missing word)	
(d)	_____ is a network tool used to determine the path packets take	[1]

		from one IP address to another.											
Ans	Traceroute												
		<i>(1 mark for writing the correct missing word)</i>											
(e)	Write the full form of the following abbreviations: (i) POP (ii) VoIP (iii) NFC (iv) FTP	[2]											
Ans	(i) POP : Post Office Protocol (ii) VoIP : Voice Over Internet Protocol (iii) NFC : Near-field communication (iv) FTP : File Transfer Protocol												
	<i>(½ Mark for writing each correct expansion)</i>												
(f)	Match the ServiceNames listed in the first column of the following table with their corresponding features listed in the second column of the table:	[2]											
	<table border="1"> <thead> <tr> <th>Technology</th> <th>Feature</th> </tr> </thead> <tbody> <tr> <td>1G</td> <td> <ul style="list-style-type: none"> <li>IP based Protocols (LTE)</li> <li>True Mobile Broadband</li> </ul> </td> </tr> <tr> <td>2G</td> <td> <ul style="list-style-type: none"> <li>Improved Data Services with Multimedia</li> <li>Mobile Broadband</li> </ul> </td> </tr> <tr> <td>3G</td> <td> <ul style="list-style-type: none"> <li>Basic Voice Services</li> <li>Analog-based protocol</li> </ul> </td> </tr> <tr> <td>4G</td> <td> <ul style="list-style-type: none"> <li>Better Voice Services</li> <li>Basic Data Services</li> <li>First digital standards (GSM,CDMA)</li> </ul> </td> </tr> </tbody> </table>	Technology	Feature	1G	<ul style="list-style-type: none"> <li>IP based Protocols (LTE)</li> <li>True Mobile Broadband</li> </ul>	2G	<ul style="list-style-type: none"> <li>Improved Data Services with Multimedia</li> <li>Mobile Broadband</li> </ul>	3G	<ul style="list-style-type: none"> <li>Basic Voice Services</li> <li>Analog-based protocol</li> </ul>	4G	<ul style="list-style-type: none"> <li>Better Voice Services</li> <li>Basic Data Services</li> <li>First digital standards (GSM,CDMA)</li> </ul>		
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	<i>(½ Mark for writing each correct match)</i>												
(g)	What is a secure communication? Differentiate between HTTP and HTTPS.	[3]											
Ans	<p><b>Secure communication</b> is when two entities are <b>communicating</b> and do not want a third party to listen in.</p> <p>The primary difference between HTTP (Hypertext Transfer Protocol) and HTTPS (Hypertext Transfer Protocol Secure) is that HTTP is not secure whereas HTTPS is a secure protocol which uses TLS/SSL certificate to ensure the authentication.</p>												
	<i>(1 mark for writing correct explanation of Secure Communication)</i> <i>(1 mark for writing correct explanation HTTP)</i> <i>(1 mark for writing correct explanation HTTPS)</i>												

(h) Helping Hands is an NGO with its head office at Mumbai and branches located at Delhi, Kolkata and Chennai. Their Head Office located at Delhi needs a communication network to be established between the head office and all the branch offices. The NGO has received a grant from the national government for setting up the network. The physical distances between the branch offices and the head office and the number of computers to be installed in each of these branch offices and the head office are given below. You as a network expert have to suggest the best possible solutions for the queries as raised by the NGO. as given in (i) to (iv).

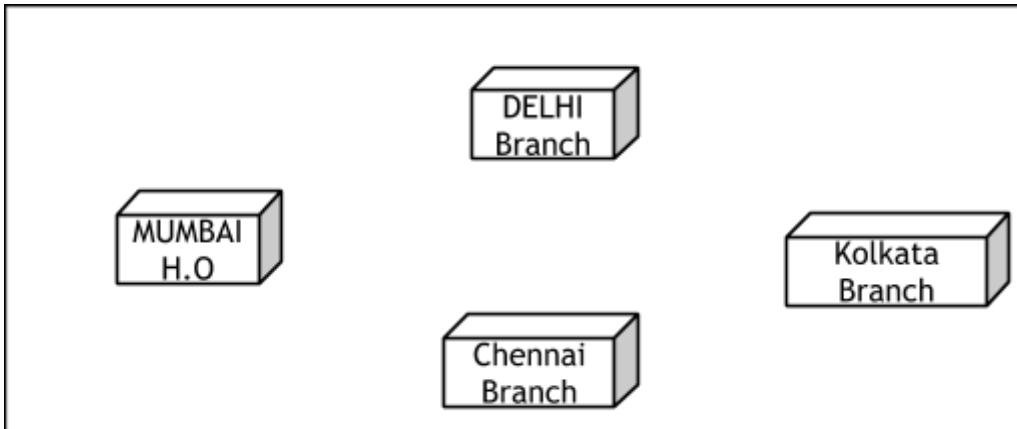
[4]

Distances between various locations in Kilometres:

Mumbai H.O. to Delhi	1420
Mumbai H.O. to Kolkata	1640
Mumbai H.O. to Chennai	2710
Delhi to Kolkata	1430
Delhi to Chennai	1870
Chennai to Kolkata	1750

Number of Computers installed at various locations are as follows:

Mumbai H.O.	2500
Delhi branch	1200
Kolkata branch	1300
Chennai branch	1100



(i) Suggest by drawing the best cable layout for effective network connectivity of all the Branches and the Head Office for communicating data.

	<b>Ans</b>		
		(1 <i>Mark for drawing the correct layout</i> )	
		(ii) Suggest the most suitable location to install the main server of this NGO to communicate data with all the offices.	
	<b>Ans</b>	MUMBAI H.O.	
		(1 <i>Mark for writing the correct location</i> )	
		(iii) Write the name of the type of network out of the following, which will be formed by connecting all the computer systems across the network: (A) WAN                    (B) MAN                    (C) LAN                    (D) PAN	
	<b>Ans</b>	(A) WAN	
		(1 <i>Mark for writing the correct option</i> )	
		(iv) Suggest the most suitable medium for connecting the computers installed across the network out of the following: (A) Optical Fibre    (B) Telephone wires    (C) Radio Waves    (D) Ethernet cable	
	<b>Ans</b>	(A) Optical Fibre	
		(1 <i>Mark for writing the correct option</i> )	
<b>SECTION C</b>			
<b>Q 4</b>	<b>(a)</b>	Which SQL command is used to add a new attribute in a table?	[1]
	<b>Ans</b>	<b>ALTER TABLE</b>	
		(1 <i>Mark for writing the correct SQL command</i> )	
	<b>(b)</b>	Which SQL aggregate function is used to count all records of a table ?	[1]
	<b>Ans</b>	<b>COUNT (*)</b>	
		(1 <i>Mark for writing the correct aggregate function</i> )	
	<b>(c)</b>	Which clause is used with a <b>SELECT</b> command in SQL to display the records in ascending order of an attribute?	[1]
	<b>Ans</b>	<b>ORDER BY</b>	
		(1 <i>Mark for writing the correct clause</i> )	



**TABLE: EMPLOYEES**

ENO	ENAME	DOJ	DNO
E2	KABIR	2005-10-25	D1

A projection upon Employees for ENAME and DOJ of all Employees will result into

**TABLE: EMPLOYEES**

ENAME	DOJ
NUSRAT	2001-11-21
KABIR	2005-10-25

(½ mark for writing each correct explanation of Selection and Projection)  
(½ mark for writing each correct example of Selection and Projection)

- (f) Write whether the following statements are True or False for the GET and POST methods in Django
- (i) POST requests are never cached
  - (ii) GET requests do not remain in the browser history

Ans (i) True  
(ii) False

(1 mark for writing True for statement (i))  
(1 mark for writing False for statement (ii))

- (g) Write outputs for SQL queries (i) to (iii), which are based on the following tables CUSTOMERS and PURCHASES [3]

Table: CUSTOMERS		
CNO	CNAME	CITIES
C1	SANYAM	DELHI
C2	SHRUTI	DELHI
C3	MEHER	MUMBAI
C4	SAKSHI	CHENNAI
C5	RITESH	INDORE
C6	RAHUL	DELHI
C7	AMEER	CHENNAI
C8	MINAKSHI	BANGALORE
C9	ANSHUL	MUMBAI

Table: PURCHASES			
SNO	QTY	PUR_DATE	CNO
S1	15	2018-12-25	C2
S2	10	2018-11-10	C1
S3	12	2018-11-10	C4
S4	7	2019-01-12	C7
S5	11	2019-02-12	C2
S6	10	2018-10-12	C6
S7	5	2019-05-09	C8
S8	20	2019-05-09	C3
S9	8	2018-05-09	C9
S10	15	2018-11-12	C5
S11	6	2018-08-04	C7

(i) SELECT COUNT(DISTINCT CITIES) FROM CUSTOMERS;

Ans COUNT(DISTINCT CITIES)  
5

(½ Mark for writing correct output with or without column headings)

(ii) SELECT MAX(PUR\_DATE) FROM PURCHASES;

	<b>Ans</b>	<b><u>MAX (PUR_DATE)</u></b> 2019-05-09  <i>(½ Mark for writing correct output with or without column headings)</i>	
		<b>(iii) SELECT CNAME, QTY, PUR_DATE FROM CUSTOMERS, PURCHASES WHERE CUSTOMERS.CNO = PURCHASES.CNO AND QTY IN (10, 20);</b>	
	<b>Ans</b>	<b>CNAME            QTY            PUR_DATE</b> <b>SANYAM            10            2018-11-10</b> <b>RAHUL            10            2018-10-12</b> <b>MEHER            20            2019-05-09</b>	
		 <i>(½ Mark for writing correct output with or without column headings)</i>	
	<b>(h)</b>	Write SQL queries for (i) to (iv), which are based on the tables: CUSTOMERS and PURCHASES given in the question 4(g):	[4]
		 (i) To display details of all CUSTOMERS whose CITIES are neither Delhi nor Mumbai	
	<b>Ans</b>	<b>SELECT * FROM CUSTOMERS WHERE CITIES NOT IN ('DELHI', 'MUMBAI');</b> <b>OR</b> <b>SELECT * FROM CUSTOMERS WHERE CITIES&lt;&gt;'DELHI' AND CITIES&lt;&gt;'MUMBAI';</b>	
		 <i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct WHERE clause)</i>	
		 (ii) To display the CNAME and CITIES of all CUSTOMERS in ascending order of their CNAME.	
	<b>Ans</b>	<b>SELECT CNAME, CITIES FROM CUSTOMERS ORDER BY CNAME;</b>	
		 <i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct ORDER BY clause)</i>	
		 (iii) To display the number of CUSTOMERS along with their respective CITIES in each of the CITIES.	
	<b>Ans</b>	<b>SELECT COUNT(*), CITIES FROM CUSTOMERS GROUP BY CITIES;</b>	
		 <i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct GROUP BY clause)</i>	
		 (iv) To display details of all PURCHASES whose Quantity is more than 15.	
	<b>Ans</b>	<b>SELECT * FROM PURCHASES WHERE QTY&gt;15;</b>	
		 <i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct WHERE clause)</i>	

#### SECTION D

<b>5</b>	<b>(a)</b>	An organisation purchases new computers every year and dumps the old ones into the local dumping yard. Write the name of the most appropriate category of waste that the organisation is creating every year, out of the following options: (A) Solid Waste    (B) Commercial Waste    (C) E-Waste    (D) Business Waste	<b>[1]</b>
----------	------------	---	------------

	<b>Ans</b>	(C) E-Waste  <b>(1 Mark for writing the correct option)</b>	
	<b>(b)</b>	Data which has no restriction of usage and is freely available to everyone under Intellectual Property Rights is categorised as: (A) Open Source    (B) Open Data    (C) Open Content    (D) Open Education	[1]
	<b>Ans</b>	(B) Open Data  <b>(1 Mark for writing the correct option)</b>	
	<b>(c)</b>	What is a Unique Id? Write the name of the Unique Identification provided by Government of India for Indian Citizens.	[2]
	<b>Ans</b>	Unique identifier (UID) is any identifier which is guaranteed to be unique among all objects and is used for identifying various objects. The Unique Identification provided by the Government of India for Indian Citizens is Aadhaar.	
		<b>(1 Mark for writing the correct explanation for Unique Id)</b> <b>(1 Mark for writing the correct name of the Unique Id)</b>	
	<b>(d)</b>	Consider the following scenario and answer the questions which follow: “A student is expected to write a research paper on a topic. The student had a friend who took a similar class five years ago. The student asks his older friend for a copy of his paper and then takes the paper and then submits the entire paper as his own research work ”  (i) Which of the following activities appropriately categorises the act of the writer: (A) Plagiarism    (B) Spamming    (C) Virus    (D) Phishing  (ii) Which kind of offense out of the following is made by the student? (A) Cyber Crime    (B) Civil Crime    (C) Violation of Intellectual Property Rights	[2]
	<b>Ans</b>	(i) (A) Plagiarism (ii) (C) Violation of Intellectual Property Rights  <b>(1 Mark for writing the correct option)</b> <b>(1 Mark for writing the correct option)</b>	
	<b>(e)</b>	What are Digital Rights? Write examples for two digital rights applicable to usage of digital technology.	[2]
	<b>Ans</b>	<b>Digital Rights:</b> The right and freedom to use all types of digital technology in an acceptable and appropriate manner as well as the right to privacy and the freedom of personal expression while using any digital media. <b>Examples: (Any two)</b> Right of privacy for personal data existing with private organisations. Right to access the Internet without tampering upon speed or bandwidth. Right to un-tweaked information on news channels and social media. Right to any kind of access to content on the web. Right to downloads or uploads. Right to unrestricted communication methods (email, chat, IM, etc.). <b>OR</b> Any other 2 correct examples of digital rights	
		<b>(1 Mark for writing the correct explanation for Digital Rights)</b> <b>(½ Mark for writing each correct example of a digital right)</b>	
	<b>(f)</b>	Suggest techniques which can be adopted to impart Computer Education for:	[2]

		(i) Visually impaired students (someone who cannot write). (ii) Speech impaired students (someone who cannot speak).	
	<b>Ans</b>	(i) For visually impaired or blind users, programs like JAWS read any text out loud. Screen-magnification programs assist partially sighted computer users. Braille keyboards or pointers attached to the mouth, finger, head or knee can also be used. (ii) Software such as speech synthesizer enables non-verbal persons to convey virtually any thought in their minds by providing them an 'artificial voice'.	
		<b><i>(1 mark for writing correct suggestion for visually impaired students )</i></b> <b><i>(1 mark for writing correct suggestion for speech impaired students )</i></b>	



SET-4

Series BVM/C

Code No. 91

Roll No.

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Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **28** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

## COMPUTER SCIENCE

Time allowed : 3 hours

Maximum Marks : 70

### **General Instructions :**

- (i) SECTION A refers to programming language C++.
- (ii) SECTION B refers to programming language Python.
- (iii) SECTION C is compulsory for all.
- (iv) Answer either SECTION A or SECTION B.
- (v) It is compulsory to mention on the page 1 in the answer-book whether you are attempting SECTION A or SECTION B.
- (vi) All questions are compulsory within each section.
- (vii) Questions 2(b), 2(d), 3 and 4 have internal choices.



## SECTION A

### [Only for candidates, who opted for C++]

1. (a) Which of the following are valid operators in C++ : 2  
(i) + =  
(ii) not  
(iii) = /  
(iv) &&  
(v) ≥  
(vi) ==  
(vii) ++  
(viii) and
- (b) Write the names of the correct header files, which must be included to compile the code successfully : 1  

```
void main()
{
    char S1[20] = "CS", S2[20] = "2018";
    strcat(S1, S2);
    cout << S1;
}
```
- (c) Rewrite the following **C++ program** after removing any/all syntactical error(s). Underline each correction done in the code : 2  
*Note : Assume all required header files are already included in the program.*  

```
#define Volume(L,B,H) = L*B*H
structure Cube
{
    int Length, Breadth, Height;
};
void main()
{
    Cube C = [10,15,20];
    cout << Volume(Length, Breadth, Height);
}
```
- (d) Find and write the output of the following C++ program code : 2  
*Note : Assume all required header files are already included in the program.*  

```
void Convert(char *P1, char *P2)
{
    char *Q;
    Q = P2;
    P2 = P1;
    P1 = Q;
    cout << P1 << "*" << P2 << endl;
}
void main()
{
    char S1[] = "One", S2[] = "Two";
    Convert(S1, S2);
    cout << S1 << "&" << S2 << endl;
}
```



- (e) Find and write the output of the following C++ program code : 3

Note : Assume all required header files are already included in the program.

```
void Alter(float &I, int J=2)
{
    I=I+J;
    J=I/J;
    cout<<I<<"#"<<J<<endl;
}
void main()
{
    float P=25, Q=15;
    Alter(P,Q);
    Alter(P);
    Alter(Q);
}
```

- (f) Observe the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the minimum and maximum values that can possibly be assigned to the variable End. 2

Note :

- Assume all the required header files are already being included in the code.
- The function random(N) generates any possible integer between 0 and N-1 (both values included).

```
void main()
{
    randomize();
    int A[]={5,10,15,20,25,30,35,40};
    int Start = random(2) + 1;
    int End = Start + random(4);
    for(int I=Start; I<=End, I++)
        cout<<A[I]<<"*";
}
```

(i) 20*25*30*35*	(ii) 15*20*25*30*
(iii) 5*15*20	(iv) 10*15*20*25*30*



2. (a) Given the following class Exam and assuming all necessary header file(s) included, answer the questions that follow the code :

```
class Exam
{
    int Marks; char EName[20];
public:
    Exam (int M)                  //Function 1
    {
        Marks = M;
    }
    Exam (char S[])               //Function 2
    {
        strcpy(EName,S);
    }
    Exam (char S[], int M)        //Function 3
    {
        Marks = M;
        strcpy(EName,S);
    }
    Exam (Exam &E)                //Function 4
    {
        Marks = E.Marks + 10;
        strcpy(EName,E.EName);
    }
};

void main()
{
    Exam E1(10);                 //Statement I
    Exam E2(70);                 //Statement II
    Exam E4("THEORY",70);        //Statement III
    _____;                      //Statement IV
}
```

- (i) Which of the statement(s) out of (I), (II), (III), (IV) is/are *incorrect* for object(s) of the class Exam ? 1
- (ii) What is Function 4 known as ? Write the **Statement IV**, that would execute **Function 4**. 1



- (b) Observe the following C++ code and answer the questions (i) and (ii).

Note : Assume all necessary files are included.

```
class Coordinate
{
    int X,Y;

public:
    Coordinate(int I=20, int J=10)      //Function 1
    {
        X = J; Y = I;
    }
    void Show()                         //Function 2
    {
        cout<< " Coordinates are " <<X<< " & " <<Y<<endl;
    }
    ~Coordinate()                      //Function 3
    {
        cout<<"Erased "<<endl;
    }
};

void main()
{
    Coordinate C(15);
    C.Show();
}
```

- (i) For the class Coordinate, what is **Function 3** known as ?  
When is it executed ? 1

- (ii) What is the output of the above code, on execution ? 1

## OR

- (b) Explain Constructor Overloading in context of Object Oriented Programming. Also give a supporting example in C++. 2



- (c) Write the definition of a class STATS in C++ with following description : 4

#### Private Members

- **Code** // integer
- **Tests** // an array of integer with 3 elements
- **Avg** // integer
- **CalAvg()** /\* Member function to calculate Avg  
as Average of values given in  
array Tests \*/

#### Public Members

- **In()** /\* Function to allow user to enter values  
of Code and Tests and then invoke  
CalAvg() to calculate average \*/
- **Out()** // Function to display all data members



- (d) Answer the questions (i) to (iv) based on the following :

4

```
class GFloor
{
    int GRooms;
protected:
    void Give();
public:
    void Take();
};

class FFloor : private GFloor
{
    int FRooms;
public:
    void Get(); void Put();
};

class SFloor : public FFloor
{
    int SRooms;
public:
    void Input(); void Output();
};

void main()
{
    SFloor S;
}
```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?

**– Single Level Inheritance, Multilevel Inheritance,  
Multiple Inheritance**

- (ii) Write the names of **all the members**, which are directly accessible by the member function **Get()** of class **FFloor**.
- (iii) Write the names of **all the members**, which are directly accessible by the member function **Input()** of class **SFloor**.
- (iv) Write the names of **all the members**, which are directly accessible by the object **S** of class **SFloor** declared in the **main()** function.

**OR**



- (d) Consider the following class Institution

4

```
class Institution
{
    int Code;
    char Course[20];
protected :
    float Fee;

public:
    void Reg() {cin>>Code;gets(Course);cin>>Fee;}
    void Show() {cout<<Code<<Course<<Fee<<endl;}
};
```

Write a code in C++ to publicly derive another class Student from the base class Institution with following members.

Data Members

Rno of type long

Name of type character of size 10

Member Functions

A constructor function to assign Rno as 100

Admit() to allow user to enter Rno and Name

Display() to display Rno and Name

3. (a) Write a user-defined function **NoThreeFive(int Arr[], int N)** in C++, which should display the value of all such elements and their corresponding locations in the array **Arr** (i.e. the array index), which are **not multiples of 3 or 5**. **N** represents the total number of elements in the array **Arr**, to be checked.

3

Example : If the array Arr contains

0	1	2	3	4
25	8	15	49	9

Then the function should display the output as

8 at location 1

49 at location 3

**OR**



- (a) Write a user-defined function **HalfReverse(int Arr[], int N)** in C++, which should first reverse the contents of the first half of the array **Arr** and then reverse the contents of the second half of the array **Arr**. The total number of elements in the array **Arr** is represented by **N** (which is an even integer). 3

Example : If the array **Arr** contains the following elements (for **N = 6**)

0	1	2	3	4	5
12	5	7	23	8	10

Then the function should rearrange the array to become

0	1	2	3	4	5
7	5	12	10	8	23

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.
- Do not use any other array to transfer the contents of array **Arr**.

- (b) Write a user-defined function **OneZero(int M[4] [4])** in C++, which replaces every occurrence of a **1** with a **0** in the array, and vice versa. 2
- For example :

ORIGINAL ARRAY M			
1	1	0	1
0	1	0	0
0	0	1	1
1	1	0	0

CHANGED ARRAY M			
0	0	1	0
1	0	1	1
1	1	0	0
0	0	1	1

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.
- Do not use any other array to transfer the contents of array **M**.

**OR**



- (b) Write a user-defined function **RowSwap(int A [4] [4])** in C++, which swaps the contents of the first row with the contents of the third row. 2

For example :

ORIGINAL ARRAY A			
10	15	20	25
30	35	40	45
50	55	60	65
70	75	80	85

CHANGED ARRAY A			
50	55	60	65
30	35	40	45
10	15	20	25
70	75	80	85

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.
- Do not use any other array to transfer the contents of array A.

- (c) Let us assume P[20][30] is a two-dimensional array, which is stored in the memory along the column with each of its elements occupying 2 bytes, find the address of the element P[3][5], if the address of the array is 45000. 3

## OR

- (c) Let us assume P[10][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 2 bytes, find the address of the element P[5][10], if the address of the element P[2][15] is 25000. 3



- (d) For the following structure of Items in C++

```
struct Item
{
    char Name[20];
    float Price;
    Item *Link;
};
```

Given that the following declaration of class ItemStack in C++ represents a dynamic stack of Items :

```
class ItemStack
{
    Item *Top; //Pointer with address of Topmost Item
               //of Stack
public:
    ItemStack()
    {
        Top = NULL;
    }
    void Push(); //Function to push an Item into the
                 //dynamic stack
    void Pop(); //Function to pop an Item from the
                 //dynamic stack
    ~ItemStack();
};
```

Write the definition for the member function void ItemStack::Pop(), that pops the details of an Item from the dynamic stack of ItemStack.

4

## OR

- (d) Write a user-defined function **Push(Item S[], int &T)**, which pushes the details of an Item, into the static stack of Items S, at the location T (representing the Top end of the stack), where every Item to be pushed into the stack is represented by the following structure : 4

```
struct Item
{
    char Name[20];
    float Price;
};
```



- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion : 2

P - Q / R ^ S + T

OR

- (e) Evaluate the following Postfix expression, showing the stack contents : 2

150, 25, 5, /, 45, +, 2, \*, -

4. (a) A text file named **IONS.TXT** contains some text. Write a user-defined function **ShowP()** in C++ which displays all such words of the file which start with alphabet 'P'. 3

For example : If the file **IONS.TXT** contains :

"Whether an atom will form a cation or an anion is based on its position in the periodic table"

Then the function **ShowP()** should display the output as

position, periodic

OR

- (a) A text file named **BIG.TXT** contains some text. Another text file named **SMALL.TXT** needs to be created such that it would store **only the first 50 characters** from the file **BIG.TXT**.

Write a user-defined function **BigToSmall()** in C++ that would perform the above task of creating **SMALL.TXT** from the already existing file **BIG.TXT**. 3

- (b) A binary file CUSTOMER.DAT contains records stored as objects of the following class :

```
class Customer
{
    int CNo; char Name[20]; char Address[30];
public:
    int *GetNo() { return CNo; }
    void Show()
    { cout<<CNo<<" * " <<Name<< " * " <<Address<<endl;
};
```

Write a user-defined function **Search(int N)** in C++, which displays the details of the Customer from the file CUSTOMER.DAT, whose CNo matches with the parameter N passed to the function. 2

OR



- (b) Write a user-defined function TotalCost() in C++ to read each object of a binary file ITEMS.DAT, and display the Name from all such records, whose Cost is above 150. Assume that the file ITEMS.DAT is created with the help of objects of class Item, which is defined below :

2

```
class Item
{
    char Name[20]; float Cost;
public:
    char* RName() { return Name; }
    float RCost() { return Cost; }
};
```

- (c) Find the output of the following C++ code considering that the binary file ITEMS.DAT exists on the hard disk with the following 5 records for the class Item containing Name and Cost.

1

Name	Cost
Rice	110
Wheat	60
Cheese	200
Pulses	170
Sauce	150

```
void main()
{
    fstream File;
    File.open("ITEMS.DAT",ios::binary|ios::in);
    Item T;
    for (int I=1; I<=2; I++)
    {
        File.seekg((2*I-1)*sizeof(T));
        File.read((char*)&T, sizeof(T));
        cout<<"Read :"<<File.tellg()/sizeof(T)<<endl;
    }
    File.close();
}
```

**OR**

- (c) Differentiate between ios::out and ios::app file modes.

1



## SECTION B

### [Only for candidates, who opted for Python]

1. (a) Which of the following are valid operators in Python ? 2
- (i)    + =
  - (ii)    ^
  - (iii)    in
  - (iv)    &&
  - (v)    between
  - (vi)    \*/
  - (vii)    is
  - (viii)    like
- (b) Name the Python Library modules which need to be imported to invoke the following functions : 1
- (i)    **open()**
  - (ii)    **factorial()**
- (c) Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code. 2
- ```
"HELLO"=String
for I in range(0,len(String)-1)
    if String[I]>="M":
        print String[I], "*"
    Else:
        print String[I-1]
```
- (d) Find and write the output of the following Python code : 2
- ```
Str1="EXAM2018"
Str2=""
I=0
while I<len(Str1):
    if Str1[I]>="A" and Str1[I]<="M":
        Str2=Str2+Str1[I+1]
    elif Str1[I]>="0" and Str1[I]<="9":
        Str2=Str2+ (Str1[I-1])
    else:
        Str2=Str2+"*"
    I=I+1
print Str2
```



- (e) Find and write the output of the following Python code :

3

```
def Alter(P=15,Q=10):
    P=P*Q
    Q=P/Q
    print P,"#",Q
    return Q

A=100
B=200

A=Alter(A,B)
print A,"$",B

B=Alter(B)
print A,"$",B

A=Alter(A)
print A,"$",B
```

- (f) What possible output(s) are expected to be displayed on screen at the time of execution of the program from the following Python code ? Also specify the minimum values that can be assigned to each of the variables BEGIN and LAST.

2

```
import random

VAL=[80,70,60,50,40,30,20,10]
Start=random.randint(1,3)
End=random.randint(Start,4)

for I in range(Start,End+1):
    print VAL[I],"*",
```

(i) 40 * 30 * 20 * 10 *	(ii) 70 * 60 * 50 * 40 * 30 *
(iii) 50 * 40 * 30 *	(iv) 60 * 50 * 40 * 30 *



2. (a) What is an Abstract Method in a class of Python ? Write a code in Python to illustrate use of an Abstract Method in Python. 2

(b) **class Matter:**

```
    Vol = 10
    Type="SOLID"
    def __init__(self,T,V=30):
        self.Type = T
        self.Vol = V
    def Disp(self):
        print self.Type,Matter.Type
        print self.Vol,Matter.Vol
M1=Matter("GAS",20)
M1.Disp()
Matter.Type="LIQUID"
M2=Matter("SOLID")
M2.Disp()
```

(b) Write the output of the above Python code. 2

**OR**

```
class Point:                      #Line 1
    def __init__(self):           #Line 2
        self.X = 20
        self.Y = 24
    def Show(self):               #Line 3
        print self.X,self.Y
    def __del__(self):             #Line 4
        print "Point Moved"
def Fun():                         #Line 5
    P=Point()                     #Line 6
    P.Show()                       #Line 7
Fun()                             #Line 8
#Line 9
#Line 10
#Line 11
#Line 12
```



- (i) What are the methods/functions mentioned in Line 2 and Line 7 specifically known as ?
- (ii) Mention the line number of the statement, which will call and execute the method/function shown in Line 2. 2
- (c) Define a class TRANSPORT in Python with the following specifications : 4

### Instance Attributes

```
- Vno           # Vehicle Number  
- Vehicle      # Vehicle Name  
- Type         # Type of the Vehicle
```

### Methods/Functions

```
- FindType()    # To assign Type of Vehicle  
                  # based on Name of the Vehicle as shown  
                  # below :
```

Vehicle	Type
MotorCycle	MCYCL
Car	MTV
Truck	HTV
Bus	HTV

```
- Enter()       # To allow user to enter value of  
                  # Vno and Vehicle. Also, this method should  
                  # call FindType() to assign Type  
- Display()     # To display Vno, Vehicle and Type
```



- (d) Answer the questions (i) to (iii) based on the following :

```
class Super(object):                      #Line 1
    def __init__(self,n):
        self.N = n
    def Set(self,n):
        self.n =self.N+n
    def SPShow(self):
        print self.N

class Top(object):                         #Line 5
    def __init__(self,n):
        self.N=n
    def Set(self,n):
        self.N =self.N+n
    def TPShow(self):
        print self.N

class Bottom(Super,Top):                  #Line 9
    def __init__(self,d):
        self.D=d
        n=0
        if self.D<10:
            n=5
        else:
            n=10
    Super.__init__(self,n)                 #Line 11
    Top.__init__(self,n)                  #Line 12
    def SetAll(self,n):                  #Line 13
        Super.Set(self,n)
        Top.Set(self,n)
    def BTShow(self):
        print self.D,
        Super.SPShow(self)
        Top.TPShow(self)
B=Bottom(101)                            #Line 15
B.SetAll(7)
B.BTShow()
```



- |       |  |   |
|-------|--|---|
| (i)   | Write the type of the inheritance illustrated in the above.                  | 1 |
| (ii)  | Find and write the output of the above code.                                 | 2 |
| (iii) | What is the difference between the statements shown in Line 11 and Line 12 ? | 1 |

## OR

- |     |   |   |
|-----|---|---|
| (d) | Define Inheritance. Show brief Python example of Single Level, Multiple and Multilevel Inheritance. | 4 |
|-----|---|---|

3. (a) Consider the following randomly ordered numbers stored in a list :

**601, 430, 160, 120, 215, 127**

Show the content of list after the First, Second and Third pass of the selection sort method used for arranging in **ascending order**.

3

*Note :* Show the status of all the elements after each pass very clearly encircling the changes.

## OR

- (a) Consider the following randomly ordered numbers stored in a list :

**601, 430, 160, 120, 215, 127**

Show the content of list after the First, Second and Third pass of the bubble sort method used for arranging in **descending order**.

3

*Note :* Show the status of all the elements after each pass very clearly encircling the changes.

- (b) Write definition of a method/function **DoubletheOdd(Nums)** to add and display twice of odd values from the list of Nums.

For example :

If the Nums contains [25, 24, 35, 20, 32, 41]

The function should display

Twice of Odd Sum: 202

3

## OR



- (b) Write definition of a method/function **FindOut(Names, HisName)** to search for HisName string from a list Names, and display the position of its presence. 3

For example :

If the Names contain `["Arun", "Raj", "Tarun", "Kanika"]` and HisName contains `"Tarun"`

The function should display

**Tarun at 2**

- (c) Write **InsQueue(Passenger)** and **DelQueue(Passenger)** methods/function in Python to add a new Passenger and delete a Passenger from a list of Passenger names, considering them to act as insert and delete operations of the Queue data structure. 4

**OR**

- (c) Write **DoPush(Customer)** and **DoPop(Customer)** methods/function in Python to add a new Customer and delete a Customer from a List of Customer names, considering them to act as push and pop operations of the Stack data structure. 4

- (d) Write a Python method/function **SwitchOver(Val)** to swap the even and odd positions of the values in the list Val. 2

*Note : Assuming that the list has even number of values in it.*

For example :

If the list Numbers contain

`[25, 17, 19, 13, 12, 15]`

After swapping the list content should be displayed as

`[17, 25, 13, 19, 15, 12]`

**OR**



- (d) Write a Python method/function **Count(Start,End,Step)** to display natural numbers from Start. 2

End in equal intervals of Step

For example :

If the values of Start as 14, End as 35 and Step as 6

The method should be displayed as

**14**

**20**

**26**

**32**

- (e) Evaluate the following Postfix expression, showing the stack contents : 2

**25, 5, \*, 15, 3, /, +, 10, -**

**OR**

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion : 2

**P \* Q + R / S - T**

4. (a) Write a statement in Python to open a text file CONTENT.TXT so that new contents can be written in it. 1

**OR**

- (a) Write a statement in Python to open a text file REMARKS.TXT so that existing content can be read from it. 1



- (b) Write a method/function **BIGWORDS()** in Python to read contents from a text file CODE.TXT, to count and display the occurrence of those words, which are having 5 or more alphabets. 2

For example :

If the content of the file is

---

**ME AND MY FRIENDS**

**ENSURE SAFETY AND SECURITY OF EVERYONE**

---

The method/function should display

**Count of big words is 5**

**OR**

- (b) Write a method/function **BIGLINES()** in Python to read lines from a text file CONTENT.TXT, and display those lines, which are bigger than 20 characters. 2

For example :

If the content of the file is

---

**Stay positive and happy**

**Work hard and dont give up hope**

**Be open to criticism and keep learning**

**Surround yourself with happy, warm and genuine people**

---

The method/function should display

**Be open to criticism and keep learning**

**Surround yourself with happy, warm and genuine people**



- (c) Considering the following definition of class ITEMS, write a method/function **LowStock()** in Python to search and display Iname and Qty from a pickled file STOCK.DAT, for the items, whose Qty is less than 10. 3

```
class ITEMS :  
  
    def __init__(self,I,Q):  
  
        self.Iname=N  
  
        self.Qty=Q  
  
    def IDisp(self):  
  
        print self.Iname,"@",self.Qty
```

## OR

- (c) Considering the following definition of class MEMBERS, write a method/function **MONTHLYMEMBERS()** in Python to search and display all the content from a pickled file MEMBERS.DAT, where Type of MEMBERS is “MONTHLY”. 3

```
class MEMBERS :  
  
    def __init__(self,N,T):  
  
        self.Name=N  
  
        self.Type=T  
  
    def Disp(self):  
  
        print self.Name,"$",self.Type
```



## SECTION C

### [For all candidates]

5. (a) Observe the following table STOCK carefully and answer the questions that follow : 2

Table : STOCK

SNO	NAME	PRICE
101	PEN	50
102	PENCIL	5
103	PENCIL	10
104	NOTEBOOK	50
105	ERASER	5

Which attribute out of SNO, NAME and PRICE is the ideal one for being considered as the Primary Key and why ?

- (b) Write SQL queries for (i) to (iv) and write outputs for SQL queries (v) to (viii), which are based on the tables given below : 6

Table : TRAINS

TNO	TNAME	START	END
11096	Ahimsa Express	Pune Junction	Ahmedabad Junction
12015	Ajmer Shatabdi	New Delhi	Ajmer Junction
1651	Pune Hbj Special	Pune Junction	Habibganj
13005	Amritsar Mail	Howrah Junction	Amritsar Junction
12002	Bhopal Shatabdi	New Delhi	Habibganj
12417	Prayag Raj Express	Allahabad Junction	New Delhi
14673	Shaheed Express	Jaynagar	Amritsar Junction
12314	Sealdah Rajdhani	New Delhi	Sealdah
12498	Shan-e-Punjab	Amritsar Junction	New Delhi
12451	Shram Shakti Express	Kanpur Central	New Delhi
12030	Swarna Shatabdi	Amritsar Junction	New Delhi



Table : PASSENGERS

PNR	TNO	PNAME	GENDER	AGE	TRAVELDATE
P001	13005	R N AGRAWAL	MALE	45	2018-12-25
P002	12015	P TIWARY	MALE	28	2018-11-10
P003	12015	S TIWARY	FEMALE	22	2018-11-10
P004	12030	S K SAXENA	MALE	42	2018-10-12
P005	12030	S SAXENA	FEMALE	35	2018-10-12
P006	12030	P SAXENA	FEMALE	12	2018-10-12
P007	13005	N S SINGH	MALE	52	2018-05-09
P008	12030	J K SHARMA	MALE	65	2018-05-09
P009	12030	R SHARMA	FEMALE	58	2018-05-09

**NOTE : All Dates are given in 'YYYY-MM-DD' format.**

- (i) To display total number of MALE and FEMALE Passengers
- (ii) To display details of all Trains which Start from Pune Junction
- (iii) To display details of all Passengers travelling in Trains whose TNO is 12030
- (iv) To display the PNR, PNAME, GENDER and AGE of all Passengers whose AGE is above 50.
- (v) `SELECT DISTINCT TRAVELDATE FROM PASSENGERS;`
- (vi) `SELECT MIN (TRAVELDATE) , MAX (TRAVELDATE) FROM PASSENGERS WHERE GENDER = 'MALE' ;`
- (vii) `SELECT START , COUNT(*) FROM TRAINS  
GROUP BY START HAVING COUNT (*)>1;`
- (viii) `SELECT TNAME , PNAME FROM TRAINS T , PASSENGERS P  
WHERE T.TNO = P.TNO AND AGE BETWEEN 40 AND 50 ;`

6. (a) State any one Absorption Law of Boolean Algebra and verify it using truth table. 2

(b) Draw the Logic Circuit of the following Boolean Expression : 2

$$A' \cdot B + A \cdot C'$$



- (c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table : 1

X	Y	Z	F(X, Y, Z)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

- (d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(P, Q, R, S) = \Sigma(2, 6, 7, 8, 9, 10, 11, 13, 14, 15)$$

7. (a) William Jones has got a file that is replicating itself in order to spread to other computers using computer network on its own, relying on security failures on the target computer to access it. It is consuming a lot of network bandwidth also. Which of the following type category of infection will it be considered ? Also, mention, what should he do to prevent this infection ? 2

- (i) Virus
- (ii) Worm
- (iii) Trojan Horse

- (b) Dr. Theekkar Singh is a very experienced orthopaedician in the Ilaj Nagar City. He is planning to connect 5 of his clinics of the city with a personalised application for his appointment organization without using mobile/web application. Which out of the following networks would be suitable ? 1

- (i) PAN
- (ii) LAN
- (iii) MAN
- (iv) WAN



- (c) Select two server side scripting languages out of the following ? 1
- (i) ASP
  - (ii) VBScript
  - (iii) JavaScript
  - (iv) PHP
- (d) Write the expanded names for the following abbreviated terms used in Networking and Communications : 2
- (i) HTML
  - (ii) PAN
  - (iii) TCP
  - (iv) GBPS
- (e) CASE STUDY BASED QUESTION

Piccadilly Design and Training Institute is setting up its centre in Jodhpur with four specialised units for Design, Media, HR and Training in separate buildings. The physical distances between these units and the number of computers to be installed in these units are given as follows.

You as a network expert, have to answer the queries as raised by the administrator as given in (i) to (iv).

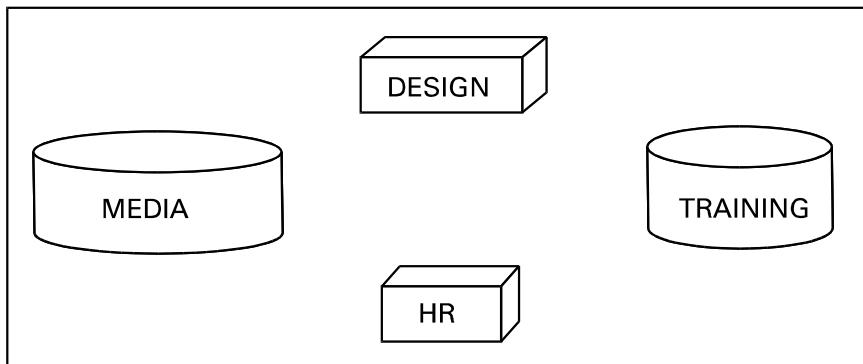
Shortest distances between various locations in metres :

Design Unit to Media Unit	60
Design Unit to HR Unit	40
Design Unit to Training Unit	60
Media Unit to Training Unit	100
Media Unit to HR Unit	50
Training Unit to HR Unit	60



Number of computers installed at various locations are as follows :

Design Unit	40
Media Unit	50
HR Unit	110
Training Unit	40



- (i) Suggest the most suitable location to install the main server of this institution to get efficient connectivity. 1
- (ii) Suggest by drawing the best cable layout for effective network connectivity of the building having server with all the other units. 1
- (iii) Suggest the devices to be installed in each of these buildings for connecting computers installed within each of the units out of the following : 1
- Modem, Switch, Gateway, Router
- (iv) Suggest an efficient as well as economic wired medium to be used within each unit for connecting computer systems out of the following network cable : 1
- Co-axial Cable, Ethernet Cable, Single Pair Telephone Cable.

**General Instructions:**

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and the teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully. **Evaluation is a 10 -12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on the latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled.
5. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.
6. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
7. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
8. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
9. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 25 answer books per day.
10. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
  - a. Leaving the answer or part thereof unassessed in an answer book.
  - b. Giving more marks for an answer than assigned to it.
  - c. Wrong transfer of marks from the inside pages of the answer book to the title page.
  - d. Wrong question wise totaling on the title page.
  - e. Wrong totaling of marks of the two columns on the title page.
  - f. Wrong grand total.
  - g. Marks in words and figures not tallying.
  - h. Wrong transfer of marks from the answer book to online award list.
  - i. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
  - j. Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

11. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as (X) and awarded zero (0) Marks.
12. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
13. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
14. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
15. The Board permits candidates to obtain a photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

**Specific Instructions:**

- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, the number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

**SECTION A - (Only for candidates, who opted for C++)**

1	(a)	Differentiate between call by value and call by reference in C++. Give an example to illustrate both.	2
	<b>Ans</b>	<p>Call by value: The formal parameters makes a copy of the actual parameters. It does not make the changes in actual parameter if the changes are done in formal parameters.</p> <p>Call by reference: The formal parameter is an alias of actual parameter. The changes made in the formal parameter are reflected in actual parameter. It is preceded by &amp;</p> <pre>void Calc(int A, int &amp;B) {     A++;     B+=A; } void main() {   int X=5, Y=10;</pre>	



		<pre>         for (R=0;R&lt;3;R++)             if (M[C][R]%5==0)                 cout&lt;&lt;M[C,R]&lt;&lt;"*";             cout&lt;&lt;endl;         }     } </pre>	
	Ans	<pre> typedef int Matrix[2][3];           //Error 1 void main() {     Matrix M={{23,45,45},{32,67,76}}; //Error 2     for (int C=0;C&lt;2;C++)           //Error 3     {         for (<u>int</u> R=0;R&lt;3;R++)      //Error 4             if (M[C][R]%5==0)                 cout&lt;&lt;<u>M[C][R]</u>&lt;&lt;"*"; //Error 5             cout&lt;&lt;endl;     } } </pre>	
		<p>(½ Mark for each correction upto a maximum of 4 corrections)</p> <p><b>NOTE:</b></p> <p>(1 Mark for only identifying any four errors correctly)</p>	
	(d)	<p>Find and write the output of the following C++ program code:  Note: Assume all required header files are already included in the program.</p> <pre> void Changer(char Text[]) {     for (int C=0;Text[C]!='\0';C++)         if (Text[C]&gt;='A' &amp;&amp; Text[C]&lt;='M')             Text[C]+=2;         else if (Text[C]&gt;='U')             Text[C]='#';         else             Text[C]++; } void main() {     char Str[]="MODULE";     Changer(Str);     cout&lt;&lt;Str&lt;&lt;endl; } </pre>	2
	Ans	OPF#NG	
		<p>(1 Mark for writing OPF as the first three characters)  (1 Mark for writing #NG as the last three characters)  OR  (Only ½ Mark for writing '#' at proper place)</p>	

		<p><b>Note:</b>  <i>Deduct only ½ Mark for any one incorrect from : OPF as first three characters</i></p>	
	(e)	<p>Find and write the output of the following C++ program code:  Note: Assume all required header files are already included in the program.</p> <pre>void Compute(int &amp;P, int Q=10) {     P=P*Q;     Q=P/Q;     cout&lt;&lt;P&lt;&lt;"#"&lt;&lt;Q&lt;&lt;endl; } void main() {     int K=15, L=5;     Compute(K,L);     Compute(L);     Compute(K); }</pre>	3
	Ans	<p>75#15  50#5  750#75</p>	
		<p><i>(½ Mark for writing each correct value)</i>  <b>OR</b>  <i>(Only ½ Mark for writing all ‘#’ at proper places)</i>  <b>Note:</b> <ul style="list-style-type: none"> <li>● <i>Deduct only ½ Mark for not considering any or all correct placement of #</i></li> <li>● <i>Deduct only ½ Mark for not considering any or all line break</i></li> </ul> </p>	
	(f)	<p>Observe the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the minimum and maximum values that can possibly be assigned to the variable Begin.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>● Assume all the required header files are already being included in the code.</li> <li>● The function random(N) generates any possible integer between 0 and N-1 (both values included)</li> </ul> <pre>void main() { randomize(); char Txt[]="ABCDEFGH"; int Begin = random(2) + 2; int Last = random(3)+ Begin;</pre>	2

		<pre> for(int C=Begin; C&lt;=Last; C++)     cout&lt;&lt;Txt[C]&lt;&lt;"#"; } </pre> <table border="1"> <tr> <td>(i) C#D#E#</td><td>(ii) E#F#G#</td></tr> <tr> <td>(iii) B#C#D#E#</td><td>(iv) F#G#H#</td></tr> </table>	(i) C#D#E#	(ii) E#F#G#	(iii) B#C#D#E#	(iv) F#G#H#	
(i) C#D#E#	(ii) E#F#G#						
(iii) B#C#D#E#	(iv) F#G#H#						
	Ans	<p>(i) C#D#E#</p> <p>Minimum value of Begin = 2 Maximum value of Begin = 3</p>					
		<p>Part 1: <i>(1 Mark for writing only the correct option)</i></p> <p>Part 2: <i>(½ Mark for writing correct Minimum value of Begin) (½ Mark for writing correct Maximum value of Begin)</i></p> <p><b>Note:</b> No marks to be awarded in Part 1, if additional options are mentioned</p>					
2.	(a)	<p>Given the following class Furniture and assuming all necessary header file(s) included, answer the questions that follow the code:</p> <pre> class Furniture {     int Code; char Type[20]; public:     Furniture(int C)           //Function 1     {         Code = C;     }     Furniture(char T[])        //Function 2     {         strcpy(Type,T);     }     Furniture(char T[], int C) //Function 3     {         Code = C;         strcpy(Type,T);     }     Furniture(Furniture &amp;F)   //Function 4     {         Code = F.Code + 10;         strcpy(Type,F.Type);     } }; </pre>					

		<pre> void main() {     Furniture F1(5);           //Statement I     Furniture F2(10);          //Statement II     Furniture F3(20, "TABLE"); //Statement III     _____;                   //Statement IV } </pre>	
	(i)	Which of the statement(s) out of (I),(II),(III),(IV) is/are incorrect for object(s) of the class Furniture.	1
	Ans	<b>Statement III is incorrect</b> OR <b>Statement III and IV are incorrect</b>	
		<i>(1 mark for writing correct option)</i> <i>(½ mark for only writing Statement IV is incorrect)</i>	
	(ii)	What is Function 4 known as ? Write the <b>Statement IV</b> , that would execute <b>Function 4</b> .	1
	Ans	<ul style="list-style-type: none"> <li>● <b>Copy Constructor</b></li> <li>● <b>Furniture F4=F1;</b> OR <b>Furniture F4(F1);</b>            OR  <b>Furniture F4=F2;</b> OR <b>Furniture F4(F2);</b>            OR  <b>Furniture F4=F3;</b> OR <b>Furniture F4(F3);</b></li> </ul>	
		<i>(½ mark for each correct answer)</i>	
		<i>Note: Any object name can be used in place of F4</i>	
	(b)	Observe the following C++ code and answer the questions (i) and (ii): Note: Assume all necessary files are included. <pre> class Packing {     int L,B; public:     Packing(int TL=10, int TB=20)    //Function 1     {         L = TB;         B = TL;     }     ~Packing()                      //Function 2     {         cout&lt;&lt;"Package Moved "&lt;&lt;endl;     }     void Display()                  //Function 3     {         cout&lt;&lt;L&lt;&lt;" &amp; "&lt;&lt;B&lt;&lt;" Units"&lt;&lt;endl;     } } </pre>	

		<pre> };  <b>void main()</b>  {      Packing P(25);      P.Display();  } </pre>	
	(i)	For the class Packing, what is <b>Function 2</b> known as ? When is it executed?	1
	Ans	<ul style="list-style-type: none"> <li>• Destructor</li> <li>• When the object goes out of scope OR mention of correct “}”</li> </ul> <p><i>(½ Mark for each correct answer)</i></p>	
	(ii)	What is the output of the above code, on execution ?	1
	Ans	<p>20 &amp; 25 Units Package Moved</p> <p><i>(½ Mark for each correct line of output)</i> <b>Note: No marks to be deducted for ignoring &amp;</b></p>	
		<b>OR</b>	
	(b)	Explain Function Overloading in context of Object Oriented Programming. Also give a supporting example in C++.	2
	Ans	<p>When two or more functions have the same name with different signature , they are said to be overloaded.</p> <p>OR</p> <p>The ability of a message to be expressed in different forms.</p> <p><b>Example:</b></p> <pre> <b>void area(float r)</b>  {      cout&lt;&lt; 3.14*r*r;  }  <b>void area(int l,int b)</b>  {      cout&lt;&lt; l * b;  }  <b>void main()</b>  { area(3.5);      area(10,20);  } </pre> <p>OR</p> <pre> <b>void area(float a);</b>  <b>void area(int a, int b);</b> </pre>	

	<p><i>(1 mark for explaining Function Overloading correctly)</i>  <i>(1 mark for writing correct supporting example)</i>  <b>OR</b>  <i>(2 Marks for illustrating the concept of Function Overloading with the help of appropriate example)</i></p>									
(c)	<p>Write the definition of a class ENVIRONMENT in C++ with following description:</p> <p>Private Members</p> <ul style="list-style-type: none"> <li>• City // character of size 20</li> <li>• PMLevel // integer</li> <li>• Health // character of size 15</li> <li>• AssignHealth()/* Member function to assign value of Health based upon PMLevel*/</li> </ul> <table border="1"> <thead> <tr> <th>PMLevel</th> <th>Health</th> </tr> </thead> <tbody> <tr> <td>Less than or equal to 50</td> <td>Healthy</td> </tr> <tr> <td>More than 50 and less than or equal to 100</td> <td>Moderate</td> </tr> <tr> <td>More than 100</td> <td>Unhealthy</td> </tr> </tbody> </table> <p>Public Members</p> <ul style="list-style-type: none"> <li>• In() /* Function to allow user to enter values of City, PMLevel and then invoke AssignHealth() to assign value of Health */</li> <li>• Out() //Function to display all the data members</li> </ul>	PMLevel	Health	Less than or equal to 50	Healthy	More than 50 and less than or equal to 100	Moderate	More than 100	Unhealthy	4
PMLevel	Health									
Less than or equal to 50	Healthy									
More than 50 and less than or equal to 100	Moderate									
More than 100	Unhealthy									
Ans	<pre>class ENVIRONMENT {     char City[20];     int PMLevel;     char Health[15];     void AssignHealth(); public :     void In();     void Out(); }; void ENVIRONMENT::AssignHealth() {     if (PMLevel&lt;=50)         strcpy(Health,"Healthy");     else if (PMLevel&lt;=100)         strcpy (Health,"Moderate");     else         strcpy(Health,"Unhealthy"); }</pre>									

	<pre> void ENVIRONMENT::In() {     gets(City);     cin&gt;&gt;PMLevel;     AssignHealth(); } void ENVIRONMENT::Out() {     cout&lt;&lt;City&lt;&lt;PMLevel&lt;&lt;Health&lt;&lt;endl; } </pre>	
	<p>(½ Mark for declaring class header correctly)  (½ Mark for declaring data members correctly)  (1 Mark for defining AssignHealth() correctly)  (½ Mark for taking inputs of City and PMLevel in In() )  (½ Mark for invoking AssignHealth() inside In())  (½ Mark for defining Out() correctly)  (½ Mark for correctly closing class declaration with a semicolon ; )</p> <p><b>NOTE:</b>  <i>Marks to be awarded for defining the member functions inside or outside the class</i></p>	
(d)	<p>Answer the questions (i) to (iv) based on the following:</p> <pre> class Complex {     int Code; protected:     double Area;char Location[20]; public:     void Get();void Put(); };  class Block: private Complex {     char BCode; public:     void BGet(); void BPut(); };  class Flat : public Block {     int FNo,NOR; public:     void FGet();      void FPut(); };  void main() {     Flat F; </pre>	4

		}	
	(i)	Which type of Inheritance out of the following is illustrated in the above example? - Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance	
	Ans	(i) Multilevel Inheritance  <i>(1 Mark for writing correct option)</i>	
	(ii)	Write the names of all the members, which are directly accessible by the member function BPut() of class Block.	
	Ans	Data Members : Area, Location, BCode Member Functions : Get(), Put(), BGet() BPut() - optional	
		<i>(1 Mark for writing all correct member names )</i> NOTE: <ul style="list-style-type: none"><li>• Marks not to be awarded for partially correct answer</li><li>• Separate specification as Data Members/Member Functions is optional</li></ul>	
	(iii)	Write the names of all the data members, which are directly accessible by the member functions of class Flat.	
	Ans	FNo, NOR	
		<i>(1 Mark for writing all correct data member names )</i> NOTE: <i>Marks not to be awarded for partially correct answer</i>	
	(iv)	Write the names of all the members, which are directly accessible by the object F of class Flat declared in the main() function.	
	Ans	FGet(), FPut(), BGet(), BPut()	
		<i>(1 Mark for writing all correct members )</i> NOTE: <i>Marks not to be awarded for partially correct answers.</i>	
		<i>OR</i>	
	(d)	Consider the following class Company: <pre>class Company {     int Code;     char Name[20]; protected:     float Turnover; public:     void In(){cin&gt;&gt;Code;gets(Name);cin&gt;&gt;Turnover;}</pre>	

	<pre> void Out() {cout&lt;&lt;Code&lt;&lt;Name&lt;&lt;Turnover&lt;&lt;endl ; } };  Write a code in C++ to privately derive another class Branch from base class Company with following members: Data Members BCode of type long BAddress of type character of size 10 Member Functions <ul style="list-style-type: none"> <li>• A constructor function to assign BCode as 1000.</li> <li>• Input() to allow user to enter BCode and BAddress.</li> <li>• Output() to display BCode and BAddress.</li> </ul> </pre>											
Ans	<pre> class Branch : private Company {     long BCode;     char BAddress[10]; public:     Branch()     {         BCode = 1000;     }     void Input()     {         cin&gt;&gt;BCode;         gets(BAddress);     }     void Output()     {         cout&lt;&lt; BCode &lt;&lt;BAddress&lt;&lt;endl;     } }; </pre>											
3	<p>(½ Mark for declaring class <i>Branch</i>)  (½ mark for inheriting using <i>:</i>)  (½ Mark for <i>private Company</i>)  (½ Mark for declaring data members correctly)  (1 Mark for defining constructor <i>Branch()</i> correctly)  (½ Mark for defining <i>Input()</i> correctly)  (½ Mark for defining <i>Output()</i> correctly)</p> <p>(a) Write a user-defined function <i>AddSevenNine(int P[], int N)</i> in C++, which should find sum of those values in array P, which are ending with 7 or 9.  Example: if the array Arr contains  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td> </tr> <tr> <td>27</td><td>18</td><td>22</td><td>39</td><td>9</td> </tr> </table>  Then the function should display the output for sum of (27, 39 and 9) as:  Sum=75</p>	0	1	2	3	4	27	18	22	39	9	3
0	1	2	3	4								
27	18	22	39	9								

	Ans	<pre>void AddSevenNine(int P[], int N) {     int Sum = 0;     for(int i=0; i&lt;N; i++)         if ((P[i] % 10 == 7)    (P[i] % 10 == 9))             Sum += P[i];     cout &lt;&lt; "Sum=" &lt;&lt; Sum &lt;&lt; endl; }</pre>																									
		<p>(½ Mark for correctly writing the loop)  (½ Mark for checking values ending with 7)  (½ Mark for checking ending with 9)  (½ Mark for using    operator between divisibility check)  (½ Mark for finding the sum of elements)  (½ Mark for displaying the sum)</p> <p>OR</p> <p>(Full 3 Marks for writing a code giving the same result)</p>																									
		<b>OR</b>																									
	(a)	<p>Write a user-defined function <code>AlterSwap(int R[], int N)</code> in C++, which should swap contents of the adjacent elements. <code>N</code> (which is an even integer) represents the total number of elements in the array <code>R</code>.</p> <p>Example: if the array <code>R</code> contains the following elements (for <code>N = 6</code>)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>20</td><td>50</td><td>70</td><td>30</td><td>80</td><td>90</td></tr> </table> <p>Then the function should rearrange the array to become</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>50</td><td>20</td><td>30</td><td>70</td><td>90</td><td>80</td></tr> </table> <p>NOTE:</p> <ul style="list-style-type: none"> <li>• DO NOT DISPLAY the Changed Array contents</li> <li>• Do not use any other array to transfer the contents of array <code>R</code>.</li> </ul>	0	1	2	3	4	5	20	50	70	30	80	90	0	1	2	3	4	5	50	20	30	70	90	80	3
0	1	2	3	4	5																						
20	50	70	30	80	90																						
0	1	2	3	4	5																						
50	20	30	70	90	80																						
	Ans	<pre>void AlterSwap(int R[], int N) {     for(int i=0; i&lt;=N-2; i+=2)     {         int t=R[i];         R[i]=R[i+1];         R[i+1]=t;     } }</pre>																									
		<p>(½ Mark for initialisation, ½ Mark for correct condition, ½ Mark for change in value of variable of the loop as part of a loop)  (1½ Mark for swapping elements - ½ mark for each sub-step)</p> <p>OR</p> <p>(Full 3 Marks for writing a code giving the same result)</p>																									
	(b)	Write a user-defined function <code>MakeChange(char T[4][4])</code> in C++, which	2																								

replaces every occurrence of alphabet 'A' with an alphabet 'X' in the array.

For example:

ORIGINAL ARRAY T			
L	A	Z	Y
A	U	R	A
F	L	A	W
H	A	Z	Y

CHANGED ARRAY T			
L	X	Z	Y
X	U	R	X
F	L	X	W
H	X	Z	Y

NOTE:

- DO NOT DISPLAY the Changed Array contents
- Do not use any other array to transfer the contents of array T.

Ans

```
void MakeChange(char T[4][4])
{
    for(int i=0;i<4;i++)
        for(int j=0;j<4;j++)
            if (T[i][j]=='A')
                T[i][j]='X';
}
```

(½ Mark for correctly writing loop for traversing rows)  
(½ Mark for correctly writing loop for traversing columns in each row)  
(½ Mark for correctly checking element to be 'A')  
(½ Mark for correctly replacing element to 'X')  
OR  
(Full 2 Marks for writing a code giving the same result)

OR

(b) Write a user-defined function **sumleft(int A[4][4])** in C++, which find the sum of left diagonal elements: 2

For example:

ORIGINAL ARRAY A			
10	12	20	22
30	32	40	42
50	52	60	62
70	72	80	82

NOTE:

- Sum of left diagonal:184

Ans

```
void sumleft(int A[4][4])
{
    int Sum = 0;
    for(int i=0;i<4;i++)
        Sum += A[i][i]; //OR           Sum += A[i][3-i];
```

		<pre> cout&lt;&lt;"Sum of left diagonal:"&lt;&lt;Sum&lt;&lt;endl; } </pre> <p> <i>(½ Mark for initialising Sum with 0)</i>  <i>(½ Mark for correctly writing loop)</i>  <i>(½ Mark for finding sum of any of the diagonal elements )</i>  <i>(½ Mark for displaying the sum with/without the preceding message)</i>  <b>OR</b>  <i>(Full 2 Marks for writing a code giving the same result)</i> </p>	
	(c)	<p>Let us assume T[10][15] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[5][7], if the address of the element T[7][10] is 35000. Also, find the total number of elements which can be stored in the Array T.</p>	3
	Ans	$  \begin{aligned}  \text{LOC}(T[5][7]) &= \text{LOC}(T[7][10]) + 4(15*(5-7)+(7-10)) \\  &= 35000 + 4(15*(-2) + (-3)) \\  &= 35000 + 4(-33) \\  &= 35000 - 132 \\  &= 34868  \end{aligned}  $ <p><b>OR</b></p> $  \begin{aligned}  \text{LOC}(T[I][J]) &= \text{Base}(T) + W * (\text{NC} * (I-\text{LBR}) + (J-\text{LBC})) \\  \text{Assuming LBR=0, LBC=0} \\  \text{LOC}(T[7][10]) &= \text{Base}(T) + 4 * (15 * 7 + 10) \\  35000 &= \text{Base}(T) + 4 * (105 + 10) \\  \text{Base}(T) &= 35000 - 4 * (115) \\  \text{Base}(T) &= 35000 - 460 \\  \text{Base}(T) &= 34540  \end{aligned}  $ $  \begin{aligned}  \text{LOC}(T[5][7]) &= 34540 + 4 * (15 * 5 + 7) \\  &= 34540 + 4 * (75 + 7) \\  &= 34540 + 4 * (82) \\  &= 34540 + 328 \\  &= 34868  \end{aligned}  $	
		<p> <i>(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)</i>  <i>(1 Mark for correct step calculations - at least one step of calculation)</i>  <i>(1 Mark for final correct address)</i> </p> <p><b>NOTE:</b>  <i>Marks to be awarded for calculating the address assuming LBR and LBC = 1</i></p>	
		<b>OR</b>	
	(c)	<p>Let us assume P[16][23] is a two dimensional array, which is stored in the memory along the column with each of its element occupying 4 bytes, find the address of the element P[5][8], if the base address of the array is 35000.</p>	3

	Ans	<pre> LOC(P[I][J])      = Base(P) + W * ((I-LBR) + NR * (J-LBC)) Assuming LBR=0, LBC=0 LOC(P[5][8])     = Base(P) + 4 * (5+16*8)                   = 35000 + 4 * (5+128)                   = 35000 + 4 * (133)                   = 35000 + 532                   = 35532 </pre>	
		<p>(1 Mark for writing correct formula (for Column major) OR substituting formula with correct values)  (1 Mark for correct step calculations - at least one step of calculation)  (1 Mark for final correct address)</p> <p><b>NOTE:</b>  <i>Marks to be awarded for calculating the address assuming LBR and LBC = 1</i></p>	
	(d)	<p>Write a user-defined function <b>Pop (Box B[], int &amp;T)</b>, which pops the details of a Box, from the static stack of Box B, at the location T (representing the Top end of the stack), where every Box of the stack is represented by the following structure.</p> <pre> <b>struct Box</b> {     int Length,Width,Height; }; </pre>	4
	Ans	<pre> <b>void Pop(Box B[],int &amp;T)</b> {     if(T!=-1) // OR if (T&gt;=0) OR if (T&gt;-1)     {         cout&lt;&lt;B[T].Length&lt;&lt;B[T].Width&lt;&lt;B[T].Height&lt;&lt;endl;         T--;     }     else         cout&lt;&lt;"Stack Empty"; } OR <b>void Pop(Box B[],int &amp;T)</b> {     if(T===-1) // OR if (T&lt;0)         cout&lt;&lt;"Stack Empty";     else     {         cout&lt;&lt;B[T].Length&lt;&lt;B[T].Width&lt;&lt;B[T].Height&lt;&lt;endl;         T--;     } } </pre>	
		(1 ½ Mark for checking EMPTY/NOT EMPTY condition)	

	<p>(1 Mark for displaying/returning the content of Top element)          (1 ½ Mark for decrementing in the value of T or Top)  <b>OR</b>          (Full 4 Marks for writing a code giving the same result)</p>	
	<b>OR</b>	
(d)	<p>For the following structure of Box in C++</p> <pre>struct Box {     int Length,Width,Height;     Box *Link; };</pre> <p>Given that the following declaration of class BoxStack in C++ represents a dynamic stack of Box:</p> <pre>class BoxStack {     Box *Top; //Pointer with address of the Topmost Box of                stack public:     BoxStack()     {         Top = NULL;     }     void Push(); //Function to push a Box into the dynamic                  stack     void Pop(); //Function to pop a Box from the dynamic                  stack     ~BoxStack(); };</pre> <p>Write the definition for the member function void BoxStack::Push(), that pushes the details of a Box into the dynamic stack of BoxStack.</p>	4
Ans	<pre>void BoxStack::Push() {     Box *T = new Box;     cin&gt;&gt;T-&gt;Length&gt;&gt;T-&gt;Width&gt;&gt;T-&gt;Height;     T-&gt;Link = Top;     Top= T; }</pre>	
	<p>(1 Mark for declaring and initialising T (Temporary Node) using new)          (1 Mark for allowing user to enter Length, Width, Height of T)          (1 Mark for linking the T link pointer correctly with Top)          (1 Mark for assigning T to Top)</p>	
(e)	Evaluate the following Postfix expression, showing the stack contents.	2

100, 2, /, 5, 2, 3, +, \*, -

Ans

Element	Stack Contents
100	100
2	100, 2
/	50
5	50, 5
2	50, 5, 2
3	50, 5, 2, 3
+	50, 5, 5
*	50, 25
-	25

Answer = 25

OR

Any other method for evaluating the given postfix expression showing the status of Stack.

(½ Mark for correctly evaluating expression up to each operator)

OR

(1 Mark only to be given for writing correct answer without showing the Stack Status)

OR

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2

U - V / W \* X + Y

Ans

((U - ((V / W) \* X)) + Y)

INFIX	STACK	POSTFIX
(		
(		
U		U
-	-	U
(		
(		
V	-	UV
/	-/	UV
W	-/	UVW
)	-	UVW/
*	-*	UVW/
X	-*	UVW/x
)	-	UVW/x*
)		UVW/x*-

+	+	UVW/X*-
Y	+	UVW/X*-Y
)		UVW/X*-Y+

OR

U - V / W \* X + Y

INFIX	STACK	POSTFIX
U		U
-	-	U
V	-	UV
/	-/	UV
W	-/	UVW
*	-*	UVW/
X	-*	UVW/X
+	+	UVW/X*-
Y	+	UVW/X*-Y
		UVW/X*-Y+

OR

Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.

(½ Mark for conversion upto each operator illustrating through stack)

OR

(1 Mark for only the final answer as UVW/X\*-Y+)

4. (a) A text file named WORDS.TXT contains some text. Write a user-defined function MAGICWORDS() in C++ to read and display those words, which is starting with alphabet 'A' (irrespective of upper or lower case).  
**For example:** if the file WORDS.TXT contains:  
A lot of adorable cute dolls were displayed in Showbiz festival.  
Anya had boxes of Pizzaz in her hand  
The function should display:  
A  
adorable  
Anya

3

Ans void MAGICWORDS ()  
{  
    ifstream f("WORDS.TXT");  
    char w[20];  
    f>>w;  
    while(!f.eof())  
    {  
        if((w[0]=='A')||(w[0]=='a')) //ignore w[0]=='a'  
            cout<<w<<endl;

```

        f>>w;
    }
    f.close();
}

OR

void MAGICWORDS()
{
    ifstream f("WORDS.TXT");
    char w[20];
    while(!f.eof())
    {
        f>>w;
        if((w[0]=='A') || (w[0]=='a')) //ignore w[0]=='a'
            cout<<w<<endl;
    }
    f.close();
}

```

*(1 Mark for opening WORDS.TXT correctly)*  
*(1 Mark for reading each Word (using any method) from the file)*  
*(½ Mark for checking word starting with alphabet ‘A’ or ‘a’)*  
*(½ Mark for displaying the word)*

**OR**

- (a) A text file named **DRAFT.TXT** contains some text. Write a user-defined function **MakeNew()** in C++, which transfers lines from **DRAFT.TXT** to **FINAL.TXT**, which are not starting with alphabet ‘X’.

3

For example: if the file **DRAFT.TXT** contains:

```

Completed 3 chapters of Chemistry
XCompleted all chapters of English
Completed 4 chapters of Physics
Completed 5 chapters of English

```

Then the function **MakeNew()** should transfer the following lines to **FINAL.TXT**:

```

Completed 3 chapters of Chemistry
Completed 4 chapters of Physics
Completed 5 chapters of English

```

Ans

```

void MakeNew()
{
    ifstream f1("DRAFT.TXT");
    ofstream f2("FINAL.TXT");
    char s[80];
    while(f1.getline(s, 80))
    {
        if(s[0]!='X')

```

		<pre>         f2&lt;&lt;s&lt;&lt;endl;     }     f1.close();     f2.close(); } </pre> <p>(½ Mark for opening DRAFT.TXT correctly)  (½ Mark for opening FINAL.TXT correctly)  (1 Mark for reading each line (using any method) from the file)  (½ Mark for checking line not starting with alphabet 'X')  (½ Mark for transferring the line to the file FINAL.TXT )</p>	
	(b)	Write a user-defined function TotalPrice() in C++ to read each object of a binary file STUDENT.DAT, and count the number of students, who are paying Fee more than 1500. Assume that the file STUDENT.DAT is created with the help of objects of class STUDENT, which is defined below:	2
		<pre> class STUDENT {     int Rno;char Name[20]; float Fee; public:     float Rfee() { return Fee; }     void Show()     {cout&lt;&lt;Rno&lt;&lt;"   "&lt;&lt;Name&lt;&lt;"   "&lt;&lt;Fee&lt;&lt;endl; } }; </pre>	
	Ans	<pre> void TotalPrice() {     ifstream f("STUDENT.DAT",ios::binary); //OR ifstream f("STUDENT.DAT",ios::binary ios::in); //OR ifstream f; //f.open("STUDENT.DAT",ios::binary ios::in);     STUDENT S;     int C=0;     while(f.read((char*)&amp;S,sizeof(S)))         if(S.Rfee()&gt;1500)             C++;     cout&lt;&lt;C&lt;&lt;endl; //Ignore     f.close(); } </pre>	
		<p>(½ Mark for opening STUDENT.DAT correctly)  (½ Mark for reading each record from the file)  (½ Mark for checking fee above 1500)  (½ Mark for counting students paying fee above 1500)</p>	
		<i>OR</i>	
	(b)	A binary file HARDWARE.DAT contains records stored as objects of the following class :	2

```

class HARDWARE
{
    int ID;  char Device[20];  float Price;
public:
    int *GetID() { return ID; }
    float *GetPrice() { return Price; }
    void Display()
    { cout<<ID<<" # "<<Device<<" # "<<Price<<endl;
};

```

Write a user-defined function **Economic()** in C++, which displays the details of those HARDWARE devices from the file HARDWARE.DAT, which are priced less than 2000.

Ans

```

void Economic()
{
    ifstream f("HARDWARE.DAT",ios::binary);
//OR ifstream f("HARDWARE.DAT",ios::binary|ios::in);
//OR
//fstream f;
//f.open("HARDWARE.DAT",ios::binary|ios::in);
    HARDWARE H;
    while(f.read((char*)&H,sizeof(H)))
        if(H.GetPrice()<2000)
            H.Display();
    f.close();
}

```

*(½ Mark for opening HARDWARE.DAT correctly)  
(1 Mark for reading each record from the file)  
(½ Mark for displaying the record)*  
*NOTE: Full 2 marks if the error in return type has been explicitly mentioned*

- (c) Find the output of the following C++ code considering that the binary file HARDWARE.DAT exists on the hard disk with the following 5 records for the class HARDWARE as declared in the previous question (4 b). 1

ID	Device	Price
101	Optical Mouse	300
103	Laser Mouse	1100
102	Wireless Keyboard	2200
104	Headphone	1700
105	Wired Keyboard	1000

```

void main()
{
    fstream File;

```

	<pre> File.open("HARDWARE.DAT",ios::binary ios::in); HARDWARE H;  File.seekg((2*sizeof(H)); File.read((char*)&amp;H, sizeof(H)); File.read((char*)&amp;H, sizeof(H)); cout&lt;&lt;H.GetPrice()&lt;&lt;endl; cout&lt;&lt;"Record:"&lt;&lt;File.tellg()/sizeof(H)&lt;&lt;endl;  File.close(); } </pre>	
Ans	<p>1700  <i>Record : 4</i></p> <p>(½ Mark for displaying correct value 1700 in first line)  (½ Mark for displaying correct value 4 in second line)</p>	
	<b>OR</b>	
(c)	Differentiate between tellp() and seekp().	1
Ans	<p><b>tellp():</b> This function returns the position of the current put pointer in terms of bytes in a file.</p> <pre>int n = f.tellp();</pre> <p><b>seekp():</b> This function takes the file put pointer to the specified byte in a file.</p> <p>Eg: f.seekp(30); // It takes a pointer to 30th byte.</p>	
	<p>(½ Mark for writing usage of tellp())  (½ Mark for writing usage of seekp())</p>	

## **SECTION B - [Only for candidates, who opted for Python]**

		(½ Mark for writing each correct Library module)	
		Note: Ignore any other Library modules, if mentioned.	
(c)		Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code. 2	
		<pre> 25=Val for I in the range(0,Val)     if I%2==0:         print I+1     Else:         print I-1 </pre>	
Ans		<u>Val = 25</u> #Error 1 <u>for I in range(0,Val):</u> #Error 2 and Error 3 <u>    if I%2==0:</u> <u>        print I+1</u> <u>    else:</u> #Error 4 <u>        print I-1</u>	
		(½ Mark for each correction, not exceeding 2 Marks) OR (1 mark for identifying the errors, without suggesting corrections)	
(d)		Find and write the output of the following python code: 2	
		<pre> Text1="AISSCE 2018" Text2="" I=0 while I&lt;len(Text1):     if Text1[I]&gt;="0" and Text1[I]&lt;="9":         Val = int(Text1[I])         Val = Val + 1         Text2=Text2 + str(Val)     elif Text1[I]&gt;="A" and Text1[I] &lt;="Z":         Text2=Text2 + (Text1[I+1])     else:         Text2=Text2 + "*"     I=I+1 print Text2 </pre>	
Ans		ISSCE *3129	
		( ½ Mark for mentioning ISS) ( ½ Mark for CE correctly)	

	(½ Mark for 31) (½ Mark for 29)	
	<b>Note:</b> <ul style="list-style-type: none"><li>● ½ Mark deduction for not including *</li></ul>	
(e)	Find and write the output of the following python code:	3
	<pre>def Convert(X=45,Y=30) :     X=X+Y     Y=X-Y     print X,"&amp;",Y     return X  A=250 B=150  A=Convert(A,B) print A,"&amp;",B B=Convert(B) print A,"&amp;",B A=Convert(A) print A,"&amp;",B</pre>	
Ans	400 & 250 400 & 150 180 & 150 400 & 180 430 & 400 430 & 180	
	(½ Mark for each correct line of output)	
	<b>Note:</b> <ul style="list-style-type: none"><li>● Deduct ½ Mark for not writing any or all '&amp;' symbol(s))</li><li>● Deduct ½ Mark for not considering any or all line breaks at proper place(s)</li></ul>	
(f)	What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum values that can be assigned to each of the variables From and To.	2
	<pre>import random  VAL=[15,25,35,45,55,65,75,85]; From=random.randint(1,3) To =random.randint(Start,4)  For I in range(From,To+1):</pre>	

		<pre>print VAL[I],"*",</pre> <table border="1"> <tr> <td>(i) 35 * 45 * 55 * 65 * 75 *</td><td>(ii) 35 * 45 * 55 *</td></tr> <tr> <td>(iii) 15 * 25 * 35 * 45 *</td><td>(iv) 35 * 45 * 55 * 65 *</td></tr> </table>	(i) 35 * 45 * 55 * 65 * 75 *	(ii) 35 * 45 * 55 *	(iii) 15 * 25 * 35 * 45 *	(iv) 35 * 45 * 55 * 65 *	
(i) 35 * 45 * 55 * 65 * 75 *	(ii) 35 * 45 * 55 *						
(iii) 15 * 25 * 35 * 45 *	(iv) 35 * 45 * 55 * 65 *						
	Ans	(ii) 35 * 45 * 55 *					
		<b>Minimum value for From:1</b> <b>Minimum value for To:1</b>					
		<i>(1 Mark for writing the correct option)</i> <i>OR</i> <i>(1 Mark for mentioning Error in question as variable Start is missing)</i>					
		<i>NOTE: No marks to be awarded for writing any additional option(s)</i> <i>(½ Mark for writing correct Minimum value of From)</i> <i>(½ Mark for writing correct Minimum value of To)</i>					
2	(a)	What is Overriding Methods in the context of Object Oriented Programming? Illustrate with a suitable example.	2				
	Ans	Override means having two methods with the same name but doing different tasks. It means that one of the methods overrides the other. <pre>class Rectangle():     def __init__(self,l,b):         self.length = l         self.breadth = b     def getArea(self):         print self.length*self.breadth class Square(Rectangle):     def __init__(self,side):         self.side = side         Rectangle.__init__(self,s,s)     def getArea(self):         print self.side*self.side s = Square(4) r = Rectangle(2,4) s.getArea() r.getArea()</pre>					
		<i>(1 Mark for defining Overriding Methods)</i> <i>(1 Mark for writing any suitable example)</i> <i>OR</i> <i>(2 Marks if the concept is explained through an example)</i>					

	(b)	<pre> <b>class Travel:</b>     <b>Fare = 1000</b>     <b>Type="AIR"</b>     <b>def __init__(self,T,F=3000):</b>         <b>self.Type = T</b>         <b>self.Fare = F</b>     <b>def Disp(self):</b>         <b>print self.Type,Travel.Type</b>         <b>print self.Fare,Travel.Fare</b> <b>T1=Travel("BUS",500)</b> <b>T1.Disp()</b> <b>Travel.Type="TRAIN"</b> <b>T2=Travel("AIR")</b> <b>T2.Disp()</b> </pre>	2
		Write the output of the above Python code.	
	Ans	<pre> <b>BUS AIR</b> <b>500 1000</b> <b>AIR TRAIN</b> <b>3000 1000</b> </pre>	
		<p><i>(½ Mark for each correct line of output)</i></p> <p><i>Note:</i></p> <p><i>Deduct ½ Mark for not considering any or all line breaks</i></p>	
		<i>OR</i>	
	(b)	<pre> <b>class Area:</b>                                     #Line 1     <b>def __init__(self):</b>                         #Line 2         <b>self.Length = 20</b>                         #Line 3         <b>self.Breadth = 10</b>                        #Line 4     <b>def Display(self):</b>                          #Line 5         <b>print self.Length,self.Breadth</b>          #Line 6     <b>def __del__(self):</b>                           #Line 7         <b>print "Area Over"</b>                      #Line 8 <b>def Work():</b>                                 #Line 9     <b>A=Area()</b>                                  #Line 10     <b>A.Display()</b>                                #Line 11 <b>Work()</b>                                    #Line 12 </pre>	
	(i)	What are Method/functions mentioned in Line 2 and Line 7 specifically known as?	

	Ans	<p>Line 2 - Constructor Line 7 - Destructor</p> <p>( <i>½ Mark for correct name of Line 2 method</i> ) ( <i>½ Mark for correct name of Line 7 method</i> )</p>									
		(ii) Mention the line number of the statement, which will call and execute the Method/function shown in Line 2.									
	Ans	B=Area()									
		( <i>1 Mark for writing the correct statement</i> )									
	(c)	Define a class ENVIRONMENT in Python with following specifications	4								
		<p><b>Instance Attributes</b></p> <ul style="list-style-type: none"> <li>• City // String</li> <li>• PMLevel // integer</li> <li>• Health // String</li> </ul> <p><b>Methods/Functions</b></p> <ul style="list-style-type: none"> <li>• AssignHealth() # To assign value of # Health based upon PMLevel</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th style="text-align: left; padding: 5px;">PMLevel</th> <th style="text-align: left; padding: 5px;">Health</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Less than/equal to 50</td> <td style="padding: 5px;">Healthy</td> </tr> <tr> <td style="padding: 5px;">More than 50 and less than/equal to 100</td> <td style="padding: 5px;">Moderate</td> </tr> <tr> <td style="padding: 5px;">More than 100</td> <td style="padding: 5px;">Unhealthy</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• In() # To allow user to enter values # of City, PMLevel and then invoke # AssignHealth() to assign value # of Health</li> <li>• Out() #To display all the Attributes</li> </ul>	PMLevel	Health	Less than/equal to 50	Healthy	More than 50 and less than/equal to 100	Moderate	More than 100	Unhealthy	
PMLevel	Health										
Less than/equal to 50	Healthy										
More than 50 and less than/equal to 100	Moderate										
More than 100	Unhealthy										
	Ans	<pre>class ENVIRONMENT: # class ENVIRONMENT( ): / class ENVIRONMENT(Object):     def __init__(self): # def __init__(self,A,B,C):         self.City="" # self.City=A         self.PMLevel=0 # self.PMLevel=B         self.Health="" # self.Health=C     def AssignHealth(self):         if self.PMLevel &lt;= 50:             self.Health="Healthy"         elif self.PMLevel &lt;=100:             self.Health="Moderate"         else:             self.PMLevel="Unhealthy"     def Enter(self):         self.City = input("Enter City")</pre>									

	<pre>         self.PMLevel = input("Enter PMLevel")         self.AssignHealth()      # OR      AssignHealth(self)     def Display(self):         print self.City         print self.PMLevel         print self.Health </pre> <ul style="list-style-type: none"> <li>• (½ Mark for correct syntax for class header)</li> <li>• (½ Mark for correct declaration of instance attributes)</li> <li>• (1 Mark for correct definition of AssignHealth() function)</li> <li>• (1 Mark for correct definition of Enter() with proper invocation of AssignHealth( ))</li> <li>• (1 Mark for correct definition of Display())</li> <li>• NOTE:</li> <li>• Deduct ½ Mark if AssignHealth() is not invoked properly inside Enter() function</li> </ul>	
(d)	Answer the questions (i) to (iii) based on the following:	

```

class Head1(object):           #Line 1
    def __init__(self,tp):     #Line 2
        self.P = tp
    def Change(self,tp):       #Line 3
        self.P = tp + self.P
    def Print1(self):          #Line 4
        print self.P
class Head2(object):           #Line 5
    def __init__(self,tq):     #Line 6
        self.Q=tq
    def Change(self,tq):       #Line 7
        self.Q =2*tq + self.Q
    def Print2(self):          #Line 8
        print self.Q

class Tail(Head1,Head2):        #Line 9
    def __init__(self,tr):     #Line 10
        self.R=tr
        Count=0
        if self.R==0:
            Count=10
        else:
            Count=20
        Head1.__init__(self,Count) #Line 11
        Head2.__init__(self,Count) #Line 12
    def ChangeAll(self,c):      #Line 13
        Head1.Change(self,c)
        Head2.Change(self,c)
    def PrintAll(self):         #Line 14

```

	<pre>         print self.R,         Head1.Print1(self)         Head2.Print2(self)  T=Tail(0)                                #Line 15 T.ChangeAll(7) T.PrintAll() </pre>	
(i)	Write the type of the inheritance illustrated in the above.	1
Ans	Multiple Inheritance  <i>(1 Mark for writing correct Inheritance type)</i>	
(ii)	Find and write the output of the above code.	2
Ans	0 17 24  <i>(1 Mark each for writing correct line of output)</i>	
(iii)	What is the difference between the statements shown in Line 11 and Line 12?	1
Ans	Line 11 calls the constructor of the parent class Head1 Line 12 calls the constructor of the parent class Head2  <i>( ½ mark for each correct answer)</i>	
	<i>OR</i>	
(d)	Differentiate between Multiple and Multilevel inheritance in Python. Illustrate the difference between the two using suitable Python codes for each.	4
Ans	<p><b>Multiple Inheritance:</b> When more than one Base Classes are inherited by a single class, it is known as Multiple Inheritance.</p> <p><b>Multi Level Inheritance:</b> When more than one generations of Classes are inherited, it is known as Multi Level Inheritance.</p> <pre> graph TD     A((A)) --&gt; C1((C))     B((B)) --&gt; C1     A2((A)) --&gt; B2((B))     B2 --&gt; C2((C)) </pre>	

		<pre> class A():     def __init__(self):         self.a = 0     def Out(self):         print self.a class B(A):     def __init__(self):         self.b=0     def Out(self):         print self.b class C(B):     def __init__(self):         self.c=0     def Out(self):         print self.c </pre>	<pre> class A():     def __init__(self):         self.a = 0     def Out(self):         print self.a class B():     def __init__(self):         self.b=0     def Out(self):         print self.b class C(A,B):     def __init__(self):         self.c=0     def Out(self):         print self.c </pre>
		<p>(½ Mark each for defining/pictorial representation of Multiple and Multi Level Inheritance)</p> <p>(½ Mark each for illustrating Multiple and Multi Level Inheritance in Python)</p>	
3	(a)	<p>Consider the following randomly ordered numbers stored in a list 60, 40, 70, 20, 50, 10</p> <p>Show the content of list after the First, Second and Third pass of the bubble sort method used for arranging in descending order?</p> <p>Note: Show the status of all the elements after each pass very clearly encircling the changes.</p>	3
	Ans	<p>60, 40, 70, 20, 50, 10</p> <p>I Pass 60, 70, 40, 50, 20, 10</p> <p>II Pass 70, 60, 50, 40, 20, 10</p> <p>III Pass 70, 60, 50, 40, 20, 10</p> <p>(1 mark for each correct pass) OR</p>	

		(2½ Marks to be awarded for all the correct passes without encircling)	
		<b>OR</b>	
	(a)	<p>Consider the following randomly ordered numbers stored in a list 70, 30, 60, 20, 15, 10</p> <p>Show the content of the list after the First, Second and Third pass of the selection sort method used for arranging in ascending order?</p> <p>Note: Show the status of all the elements after each pass very clearly encircling the changes.</p>	3
	Ans	<p>70, 30, 60, 20, 15, 10</p> <p><b>I Pass</b> 10, 30, 60, 20, 15, 70</p> <p><b>II Pass</b> 10, 15, 60, 20, 30, 70</p> <p><b>III Pass</b> 10, 15, 20, 60, 30, 70</p>	
		<p>(1 mark for each correct pass with encircling)</p> <p><b>OR</b></p> <p>(2½ Marks to be awarded for all the correct passes without encircling)</p>	
	(b)	<p>Write definition of a method/function <b>TenTimesEven(VALUES)</b> to add and display the sum of ten times of the even values present in the list of <b>VALUES</b>.</p> <p>For example, If the Nums contain [5, 2, 3, 6, 3, 4] The method/function should display Twice of Odd Sum: 120 (i.e. 2x10 + 6x10 + 4x10)</p>	3
	Ans	<pre>def TenTimesEven(VALUES) :     se=0     for i in range(6): # range(0,6):         if VALUES[i]%2==0:             se=se+VALUES[i]*10     print "Even Sum:",se</pre> <p>OR</p> <pre>def TenTimesEven(VALUES) :     so=0     for i in range(6): # range(0,6):         if VALUES[i]%2!=0:             so=so+VALUES[i]*10</pre>	

		<pre>print "Odd Sum:", so</pre> <p>(½ mark for function header)  (½ mark for initializing so (sum) with 0)  (½ mark for reading each element of the list using a loop)  (½ mark for checking whether the value is even or odd)  (½ mark for adding it to the sum )  (½ mark for printing or returning the sum)</p>	
		<i>OR</i>	
	(b)	<p>Write definition of a method/function <b>EndingA(Names)</b> to search and display those strings from the list of Names, which are ending with 'A'.</p> <p>For example,  If the Names contain [ "JAYA" , "KAREEM" , "TARUNA" , "LOVISH" ]</p> <p>The method/function should display</p> <p>JAYA  TARUNA</p>	3
	Ans	<pre>def Ending(Names):     for N in Names:         if N[len(N)-1]=='A':             print N</pre>	
		<p>(½ Mark for function header)  ( 1 Mark for correct loop)  ( 1 Mark for checking for last character)  ( ½ mark for printing the value of N)</p>	
	(c)	<p>Write <b>InsertQ(Customer)</b> and <b>DeleteQ(Customer)</b> methods/functions in Python to add a new Customer and delete a Customer from a list of Customer names, considering them to act as insert and delete operations of the Queue data structure.</p>	4
	Ans	<pre>def InsertQ(queue):     a=input("enter customer name: ")     queue.append(a) def DeleteQ(queue):     if (queue==[]):         print "Queue empty"     else:         print "Deleted element is: ",queue[0]         del queue[0]</pre> <p>OR</p> <pre>class queue:     Customer=[]     def InsertQ(self):         a=input("Customer name: ")</pre>	

	<pre> queue.Customer.append(a) def DeleteQ(self):     if (queue.Customer==[]):         print "Queue empty"     else:         print "Deleted element : ",queue.Customer[0]         del queue.Customer[0] </pre> <p>(½ mark insert header)  (½ mark for accepting a value from user)  (½ mark for adding value in list)  (½ mark for delete header)  (½ mark for checking empty list condition)  (½ mark for displaying “Queue empty”)  (½ mark for displaying the value to be deleted)  (½ mark for deleting value from list)</p>	
	<i>OR</i>	
(c)	Write <code>MakePush(Package)</code> and <code>MakePop(Package)</code> methods/functions in Python to add a new Package and delete a Package from a List of Package Description, considering them to act as push and pop operations of the Stack data structure.	[4]
Ans	<pre> def MakePush(Package):     a=input("enter package title : ")     Package.append(a) def MakePop(Package):     if (Package==[]):         print "Stack empty"     else:         print "Deleted element:",Package.pop() </pre> <p><b>OR</b></p> <pre> class Stack:     Package=[] def MakePush(self):     a=input("enter package title : ")     Stack.Package.append(a) def MakePop(self):     if (Stack.Package==[]):         print "Stack empty"     else:         print "Deleted element:",Stack.Package.pop() </pre> <p>(½ mark for <code>MakePush()</code> header)  (½ mark for accepting a value from user)  (½ mark for adding value in list)  (½ mark for <code>MakePop()</code> header)  (½ mark for checking empty list condition)  (½ mark for displaying “Stack empty”)  (½ mark for displaying the value to be deleted)  (½ mark for deleting value from list)</p>	

	(d)	<p>Write a python method/function <b>Scroller</b>(<b>Lineup</b>) to scroll all the elements of a list <b>Lineup</b> by one element ahead and moving the last element to the first. Also, display the changed content of the list.</p> <p>For Example: If the list has following values in it [25, 30, 90, 110, 16] After changing the list content should be displayed as [16, 25, 30, 90, 110]</p>	2
	Ans	<pre>def Scroller(Lineup):     K=Lineup[len(Lineup)-1]     del Lineup[len(Lineup)-1]     Lineup=[K]+Lineup     print Lineup</pre>	
		<p>(½ mark for function header) (½ mark for Storing the last element in temporary variable) (½ mark for Deleting Last element) (½ mark for adding value from temporary variable to the beginning of list) (½ mark for displaying the list with changed content - if the earlier marks &lt;2) <b>OR</b> <b>(Full 2 Marks to awarded for using any alternative method for performing the same)</b></p>	
		<b>OR</b>	
	(d)	<p>Write a python method/function <b>REVERSAR</b>(<b>Number</b>) to find a new number <b>Reverse</b> from <b>Number</b> with each of the digits of <b>Number</b> in reversed order and display the content of <b>Reverse</b> on screen.</p> <p>For Example: If the value of <b>Number</b> is 3451</p> <p>The method/function should be displayed as 1543</p>	2
	Ans	<pre>def REVERSAR(Number):     S=0     while Number&gt;0:         S=S*10+Number%10         Number=Number/10     print(S)</pre>	
		<p>(½ mark for function header) (½ mark for the correct loop) (½ mark for updating the reverse expression) (½ mark for Number=Number/10)</p>	

	( <i>½ mark for displaying the list with reversed content - if the earlier marks &lt;2&gt;</i> )																																		
(e)	Evaluate the following Postfix expression, showing the stack contents.  46, 2, / , 5, 3, *, -, 20, +	2																																	
Ans	<table border="1"> <thead> <tr> <th>Element</th><th>Stack Contents</th></tr> </thead> <tbody> <tr><td>46</td><td>46</td></tr> <tr><td>2</td><td>46, 2</td></tr> <tr><td>/</td><td>23</td></tr> <tr><td>5</td><td>23, 5</td></tr> <tr><td>3</td><td>23, 5, 3</td></tr> <tr><td>*</td><td>23, 15</td></tr> <tr><td>-</td><td>8</td></tr> <tr><td>20</td><td>8, 23</td></tr> <tr><td>+</td><td>31</td></tr> </tbody> </table> <p>Answer = 31 OR Any other method for evaluating the given postfix expression showing the status of Stack.</p>	Element	Stack Contents	46	46	2	46, 2	/	23	5	23, 5	3	23, 5, 3	*	23, 15	-	8	20	8, 23	+	31														
Element	Stack Contents																																		
46	46																																		
2	46, 2																																		
/	23																																		
5	23, 5																																		
3	23, 5, 3																																		
*	23, 15																																		
-	8																																		
20	8, 23																																		
+	31																																		
	( <i>½ Mark for correctly evaluating expression up to each operator</i> ) OR ( <i>1 Mark only to be given for writing correct answer without showing the Stack Status</i> )																																		
	<i>OR</i>																																		
(e)	Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.  J + K / L - M * N	2																																	
Ans	<p style="text-align: center;">((J + (K / L)) - (M * N))</p> <table border="1"> <thead> <tr> <th>INFIX</th><th>STACK</th><th>POSTFIX</th></tr> </thead> <tbody> <tr><td>(</td><td></td><td></td></tr> <tr><td>(</td><td></td><td></td></tr> <tr><td>J</td><td></td><td>J</td></tr> <tr><td>+</td><td>+</td><td>J</td></tr> <tr><td>(</td><td></td><td></td></tr> <tr><td>K</td><td>+</td><td>JK</td></tr> <tr><td>/</td><td>+/</td><td>JK</td></tr> <tr><td>L</td><td>+/-</td><td>JKL</td></tr> <tr><td>)</td><td>+</td><td>JKL/</td></tr> <tr><td>)</td><td></td><td>JKL/+</td></tr> </tbody> </table>	INFIX	STACK	POSTFIX	(			(			J		J	+	+	J	(			K	+	JK	/	+/	JK	L	+/-	JKL	)	+	JKL/	)		JKL/+	
INFIX	STACK	POSTFIX																																	
(																																			
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J		J																																	
+	+	J																																	
(																																			
K	+	JK																																	
/	+/	JK																																	
L	+/-	JKL																																	
)	+	JKL/																																	
)		JKL/+																																	

-	-	JKL/+
(		
M	-	JKL/+M
*	-*	JKL/+M
N	-*	JKL/+MN
)	-	JKL/+MN*
)		JKL/+MN*-

OR

J + K / L - M \* N

INFIX	STACK	POSTFIX
J		J
+	+	J
K	+	JK
/	+/	JK
L	+/	JKL
-	-	JKL/+
M	-	JKL/+M
*	-*	JKL/+M
N	-*	JKL/+MN
		JKL/+MN*-

OR

Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.

(½ Mark for conversion upto each operator illustrating through stack)

OR

(1 Mark for only the final answer as JKL/+MN\*-)

- 4 (a) Write a statement in Python to open a text file MARKER.TXT so that existing content can be read from it. 1

Ans `file= open("MARKER.TXT", "r")`  
 OR  
`file= open("MARKER.TXT", "r+")`  
 (1 mark for correct statement)

OR

- (a) Write a statement in Python to open a text file DATA.TXT so that new contents can be written in it.

Ans `file= open("DATA.TXT", "w")`  
 OR  
`file= open("DATA.TXT", "w+")`  
 (1 mark for correct statement)

	(b)	<p>Write a method/function ABLINES() in python to read contents from a text file LINES.TXT, to display those lines, which are either starting with an alphabet 'A' or starting with alphabet 'B'.</p> <p>For example: If the content of the file is</p> <hr/> <p><b>A BOY IS PLAYING OUTSIDE THE PLAYGROUND IS BIG BANYAN TREE IS IN THE GROUND</b></p> <hr/> <p>The method/function should display <b>A BOY IS PLAYING OUTSIDE BANYAN TREE IS IN THE GROUND</b></p>	2
	Ans	<pre>def ABLINES():     file=open('LINES.TXT','r')     lines = file.readlines()     for w in lines:         if w[0]==="A" or w[0]==="B":             print w     file.close()</pre> <p><i>(½ Mark for opening the file) (½ Mark for reading all lines, and using loop) (½ Mark for checking condition) (½ Mark for printing lines)</i></p>	
		<i>OR</i>	
	(b)	<p>Write a method/function SHORTWORDS() in python to read lines from a text file WORDBANK.TXT, and display those words, which are lesser than 5 characters.</p> <p>For example: If the content of the file is</p> <hr/> <p><b>HAPPY JOY WELCOME KITE LOVELY POSITIVE FUN</b></p> <hr/> <p>The method/function should display <b>JOY KITE FUN</b></p>	2
	Ans	<pre>def SHORTWORDS():     c=0     file=open('WORDBANK.TXT','r')     line = file.read()     word = line.split()     for w in word:         if len(w)&lt;5:</pre>	

		<pre>         print w         file.close() </pre> <p>(½ Mark for opening the file)  (½ Mark for reading line and/or splitting)  (½ Mark for checking condition)  (½ Mark for printing word)</p>	
	(c)	Considering the following definition of class MEDICINES, write a method/function MildMedicine() in python to search and display Mname and Type from a pickled file MEDI.DAT, for the MEDICINES, whose type is "MILD".	3
		<pre> class MEDICINES:     def __init__(self,MN,T):         self.Mname=MN         self.Type=T     def MDisplay(self):         print self.Mname,"&gt;&gt;",self.Type </pre>	
	Ans	<pre> def MildMedicine():     M=MEDICINES()     file=open('MEDI.DAT','rb')     try:         while True:             S=pickle.load(file)             if M.Mname=="MILD":                 S.MDisplay()     except EOFError:         pass     file.close() </pre>	
		<p>(½ Mark for correct function header)  (½ Mark for opening the file MEDI.DAT correctly)  (½ Mark for correct loop)  (½ Mark for correct load())  (½ Mark for correct checking of Mname)  (½ Mark for displaying the record)</p> <p><b>Note: Marks should not be deducted if try except is not used</b></p>	
		<b>OR</b>	
	(c)	Considering the following definition of class STUDENT, write a method/function MERIT() in python to search and display all the content from a pickled file STUDENT.DAT, where Marks of STUDENT is more than 75.	3
		<pre> class STUDENT:     def __init__(self,N,M):         self.Name=N         self.Marks=M     def Display(self):         print self.Name,"&gt;&gt;",self.Marks </pre>	
	Ans	<pre> def MERIT(): </pre>	

```

S=STUDENT()
file=open('STUDENT.DAT','rb')
try:
    while True:
        S=pickle.load(file)
        if S.Marks > 75:
            S.Display()
except EOFError:
    pass
file.close()

```

*(½ Mark for correct function header)*  
*(½ Mark for opening the file STUDENT.DAT correctly)*  
*(½ Mark for correct loop)*  
*(½ Mark for correct load())*  
*(½ Mark for correct checking of Marks)*  
*(½ Mark for displaying the record)*

*Note: Marks should not be deducted if try except is not used*

### SECTION C - (For all the candidates)

5	(a)	Observe the following tables carefully and answer the questions that follow:	2
---	-----	--	---

TABLE : FARMER	
FNO	NAME
101	Ramya Sarkar
102	Ram Dhyan
103	Gagan Hari
104	Ram Dhyan

	Which attribute out of the two attributes FNO and NAME in table FARMER should be considered as Primary Key? Give reason for your selection of the same.	
--	---	--

Ans	<b>Primary Key: FNO</b> <b>Reason: Unique values for identification of each tuple/record</b>	
-----	---	--

	<i>(1 Mark for writing correct attribute)</i> <i>(1 Mark for writing correct reason)</i>	
--	---	--

(b)	Write SQL queries for (i) to (iv) and write outputs for SQL queries (v) to (viii), which are based on the following tables:	6
-----	---	---

	<b>Table: FACULTY</b>	
	<b>FCODE</b>	<b>FNAME</b>
	F1001	Hari Charan Jha
	F1004	Merry Jose
		<b>Gender</b>
		Male
		Female
		<b>Room</b>
		101
		202
		<b>Subject</b>
		English
		Programming
		<b>JoinDate</b>
		2000-10-11
		2003-11-30

F1002	Fardeen Khan	Male	301	Web Design	2001-09-06
F1005	Priya Maheshwari	Female	302	Web Design	2004-12-15
F1009	Tanya Santan	Female	203	Programming	2006-12-31
F1006	Amar Anshul	Male	208	Data Structure	2005-05-02

Table: SCHEDULE

CCODE	PCODE1	FCODE2	FCODE3	FCODE4
C1	F1009	F1002	F1001	F1005
C2	F1001	F1009	F1005	F1006
C3	F1006	F1001	F1004	F1002
C4	F1002	F1006	F1009	F1001

NOTE: All Dates are given in 'YYYY-MM-DD' format

- (i) To display details of all Male faculties from the FACULTY table

Ans `SELECT * FROM FACULTY WHERE Gender='Male';`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (ii) To display the FCODE, FNAME and GENDER of all faculties, who are either teaching subject "Programming" or teaching subject "Web Design".

Ans `SELECT FCODE, FNAME, Gender FROM FACULTY  
WHERE SUBJECT='Programming' OR SUBJECT='Web Design';`

OR

`SELECT FCODE, FNAME, Gender FROM FACULTY  
WHERE Subject IN('Programming', 'Web Design');`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (iii) To display FCODE, FNAME, JOINDATE, ROOM of all faculty members in descending order of the ROOM numbers.

Ans `SELECT FCODE, FNAME, JOINTDATE, ROOM FROM FACULTY  
ORDER BY ROOM DESC;`

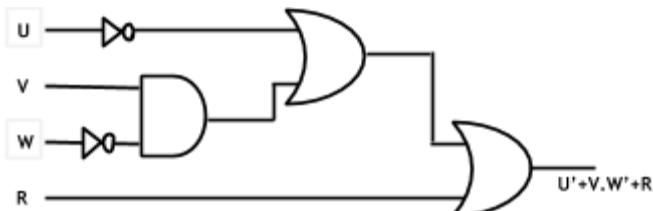
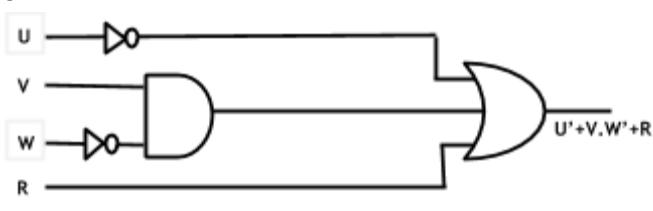
*(½ Mark for correct SELECT statement)  
(½ Mark for correct ORDER BY clause)*

- (iv) To add a new faculty member with the following details:

F1010	Anish Mohanty	M	209	Data Structure	2019-03-22
-------	---------------	---	-----	----------------	------------

Note: While writing the answers of the following output questions, consider

		the original data as given in the above tables (i.e., without considering the changes done by part iv of this question)									
	Ans	<pre>INSERT INTO FACULTY VALUES ('F1010', 'Anish Mohanty', 'M', 209, 'Data Structure', '2019-03-22');</pre> <ul style="list-style-type: none"> <li>• (<i>1/2 Mark for correct INSERT statement</i>)</li> <li>• (<i>1/2 Mark for correct inserting correct values</i>)</li> </ul>									
	(v)	<pre>SELECT COUNT(FCODE1),COUNT(FCODE2) FROM SCHEDULE WHERE FCODE1='F1009' OR FCODE2='F1009';</pre>									
	Ans	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%;"><u>COUNT(FCODE1)</u></th> <th style="text-align: left; width: 50%;"><u>COUNT(FCODE2)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> </tr> </tbody> </table> <p>OR</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%;"><u>COUNT(FCODE1)</u></th> <th style="text-align: left; width: 50%;"><u>COUNT(FCODE2)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </tbody> </table> <p>OR</p> <p>FCODE1 is not an attribute of SCHEDULE</p>	<u>COUNT(FCODE1)</u>	<u>COUNT(FCODE2)</u>	2	2	<u>COUNT(FCODE1)</u>	<u>COUNT(FCODE2)</u>	1	1	
<u>COUNT(FCODE1)</u>	<u>COUNT(FCODE2)</u>										
2	2										
<u>COUNT(FCODE1)</u>	<u>COUNT(FCODE2)</u>										
1	1										
		<p>(<i>1/2 Mark for writing correct output</i>)</p> <p>OR</p> <p>(<i>1/2 Mark for writing FCODE1 not present OR statement conveying similar meaning</i>)</p>									
	(vi)	<pre>SELECT CCODE,FCODE3,FNAME FROM FACULTY,SCHEDULE WHERE FACULTY.FCODE=SCHEDULE.FCODE3 AND FACULTY.FCODE='F1001';</pre>									
	Ans	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 33.33%;"><u>CCODE</u></th> <th style="text-align: left; width: 33.33%;"><u>FCODE3</u></th> <th style="text-align: left; width: 33.33%;"><u>FNAME</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">C1</td> <td style="text-align: center;">F1001</td> <td style="text-align: center;">Hari Charan Jha</td> </tr> </tbody> </table>	<u>CCODE</u>	<u>FCODE3</u>	<u>FNAME</u>	C1	F1001	Hari Charan Jha			
<u>CCODE</u>	<u>FCODE3</u>	<u>FNAME</u>									
C1	F1001	Hari Charan Jha									
		<p>(<i>1/2 Mark for correct output</i>)</p> <p><b>NOTE:</b> Values may be written in any order</p>									
	(vii)	<pre>SELECT GENDER,COUNT(*) FROM FACULTY GROUP BY GENDER;</pre>									
	Ans	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 33.33%;"><u>GENDER</u></th> <th style="text-align: left; width: 33.33%;"><u>COUNT(*)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Male</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">Female</td> <td style="text-align: center;">3</td> </tr> </tbody> </table>	<u>GENDER</u>	<u>COUNT(*)</u>	Male	3	Female	3			
<u>GENDER</u>	<u>COUNT(*)</u>										
Male	3										
Female	3										
		<p>(<i>1/2 Mark for correct output</i>)</p> <p><b>NOTE:</b> Values may be written in any order</p>									
	(viii)	<pre>SELECT MIN(ROOM) FROM FACULTY WHERE JOINDATE&gt;'2004-12-15';</pre>									
	Ans	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>MIN(ROOM)</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">203</td> </tr> </tbody> </table>	<u>MIN(ROOM)</u>	203							
<u>MIN(ROOM)</u>											
203											
		<p>(<i>1/2 Mark for correct output</i>)</p>									
6	(a)	Verify the following using truth table.	2								

		(i) $X \cdot (X+Y) = X$ (ii) $X+X' \cdot Y = X+Y$																														
Ans	Verification using truth table																															
	(i)	<table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th><math>X + Y</math></th> <th><math>X \cdot (X+Y)</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table> 	X	Y	$X + Y$	$X \cdot (X+Y)$	0	0	0	0	0	1	1	0	1	0	1	1	1	1	1	1										
X	Y	$X + Y$	$X \cdot (X+Y)$																													
0	0	0	0																													
0	1	1	0																													
1	0	1	1																													
1	1	1	1																													
	(ii)	<table border="1"> <thead> <tr> <th>X</th> <th><math>X'</math></th> <th>Y</th> <th><math>X+Y</math></th> <th><math>X' \cdot Y</math></th> <th><math>X+X' \cdot Y</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> </tr> </tbody> </table> 	X	$X'$	Y	$X+Y$	$X' \cdot Y$	$X+X' \cdot Y$	0	1	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	1	1	0	1	1	0	1
X	$X'$	Y	$X+Y$	$X' \cdot Y$	$X+X' \cdot Y$																											
0	1	0	0	0	0																											
0	1	1	1	1	1																											
1	0	0	1	0	1																											
1	0	1	1	0	1																											
		(1 Mark for correctly verifying the $X \cdot (X+Y) = X$ using Truth Table) (1 Mark for correctly verifying the $X+X' \cdot Y = X+Y$ using Truth Table)																														
(b)	Draw the Logic Circuit of the following Boolean Expression: $U' + V \cdot W' + R$		2																													
Ans	 <b>OR</b> 																															
	(Full 2 Marks for drawing the Logic Circuit for the expression correctly) <b>OR</b> (1 Mark for drawing Logic circuit for $(V \cdot W')$ correctly) (1/2 Mark for drawing Logic circuit for $(U' + R)$ correctly)																															
(c)	Derive a Canonical POS expression for a Boolean function F, represented by the following truth table:		1																													

P	Q	R	$F(P, Q, R)$
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

Ans  $F(P, Q, R) = (P+Q+R) \cdot (P+Q'+R') \cdot (P'+Q+R') \cdot (P'+Q'+R')$

OR

$F(P, Q, R) = \Pi(0, 3, 5, 7)$

(1 Mark for correctly writing the POS form)

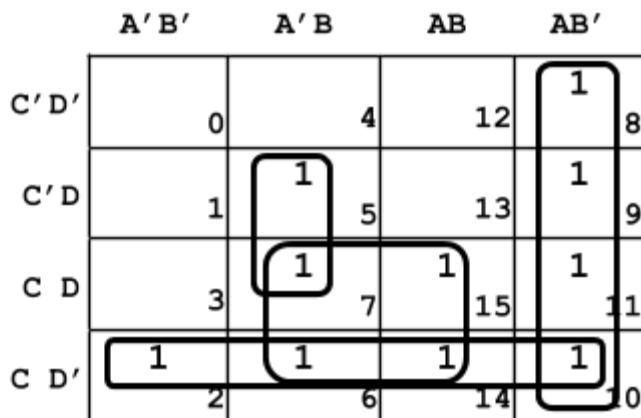
OR

(1/2 Mark for any two correct terms)

Note: Deduct 1/2 mark if wrong variable names are written in the expression

- (d) Reduce the following Boolean Expression to its simplest form using K-Map: 3

$$F(A, B, C, D) = \sum(2, 5, 6, 7, 8, 9, 10, 11, 14, 15)$$



Minimal expression :  $CD' + AB' + BC + A'BD$

	$A'B'$	$A'B$	$AB$	$AB'$
$C'D'$	0	4	12	1 8
$C'D$	1	1 5	13	1 9
$C'D$	3	1 7	1 15	1 1
$C'D'$	1 2	1 6	1 14	1 0

Minimal expression :  $CD' + AB' + AC + A'BD$

	$C'D'$	$C'D$	$CD$	$CD'$
$A'B'$	0	1	3	1 2
$A'B$	4	1 5	1 7	1 6
$AB$	12	13	1 15	1 14
$AB'$	1 8	1 9	1 11	1 10

Minimal expression :  $CD' + AB' + BC + A'BD$

(½ Mark for drawing K-Map and correctly plotting 1s in the given cells)

(½ Mark each for 4 groupings)

(½ Mark for writing final expression in reduced/minimal form)

Note:

- Deduct ½ mark if wrong variable names are used
- Deduct ½ mark if 0 is mentioned in place of 1

- 7 (a) Priyam Chattopadhyay found one file XYX.EXE in his computer and he has been informed by his computer expert friend that he should not execute the file and not to send to anyone as it is infected and unless he runs or opens, it won't cause any harm. Which of the following type category of infection it will be considered? Also, mention, what he should do to prevent this infection?  
 (i) Virus      (ii) Worm      (iii) Trojan Horse

2

- Ans (i) Virus OR (iii) Trojan Horse

Use an antivirus application to prompt him about threats and to disinfect the affected files.

(1 Mark for writing any correct answer Virus OR Trojan Horse)  
 (1 Mark for writing any correct preventive measure)

- (b) Ravi Jayaraman wants a client/server protocol, in which e-mail is

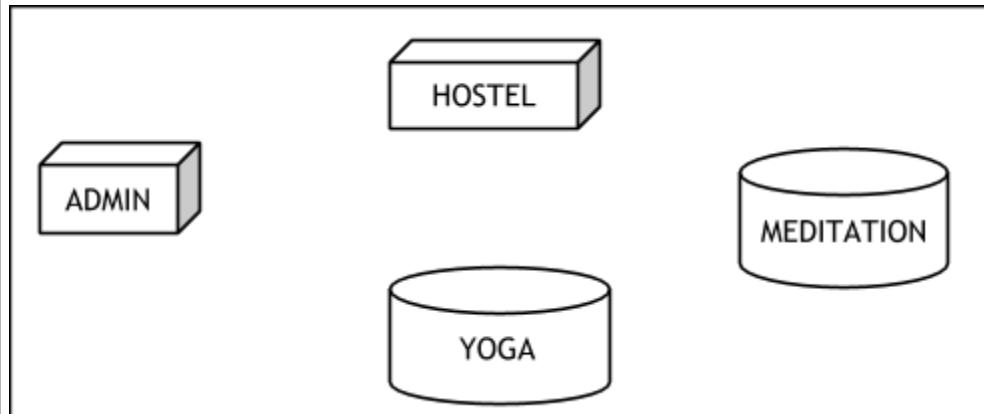
1

	<p>received and held by him on his computer from Internet server. Regularly, it should check his mail-box on the email server and download mails to his computer. Which protocol out of the following will be ideal for the same?</p> <p>(i) POP3    (ii) SMTP    (iii) VoIP    (iv) HTTP</p>											
<b>Ans</b>	(i) POP3											
	<p><b>(1 Mark for writing correct answer)</b>  <b>(½ Mark for writing SMTP)</b></p>											
<b>(c)</b>	Give two differences between 2G and 3G telecommunication technologies	1										
<b>Ans</b>	<p><b>2G :</b>  <b>Better Voice Services</b>  <b>Basic Data Services</b>  <b>Speed: 64 kbps</b>  <b>Used normally for Text chats</b></p>											
	<p><b>3G:</b>  <b>Improved Data Services with Multimedia</b>  <b>Mobile Broadband</b>  <b>Speed:2 mbps</b>  <b>Used normally for Video conferencing</b></p>											
	<p><b>(½ Mark for writing each correct difference upto any two differences)</b></p>											
<b>(d)</b>	Write the expanded names for the following abbreviated terms used in Networking and Communications:	2										
	<p>(i) PPP    (ii) HTTP    (iii) GSM    (iv) FTP</p>											
<b>Ans</b>	<p>(i) Point-to-Point Protocol  (ii) HyperText Transfer Protocol  (iii) Global System for Mobile Communication  (iv) File Transfer Protocol</p>											
	<p><b>(½ Mark each for writing correct expansion)</b></p>											
<b>(e)</b>	<p>Evolving World Centre is a charitable trust responsible for providing yoga and meditation training to young and old persons for helping the society to have good health and also spreading peace in the society. The centre is planning to make full use of technology tools and modern gadgets in the centre for 100% utilisation of the resources. The centre has four different wings spread out in approximately 20000 square metre of area. The physical distances between these wings and the number of computer systems to be installed in these wings are given as follows. You as a network expert have to answer the queries as raised by their administrators in (i) to (iv).</p> <p>Shortest distances between various wings in metres:</p> <table border="1"> <tr> <td>YOGA wing to ADMIN wing</td> <td>50</td> </tr> <tr> <td>YOGA wing to HOSTEL wing</td> <td>70</td> </tr> <tr> <td>YOGA wing to MEDITATION wing</td> <td>50</td> </tr> <tr> <td>ADMIN wing to HOSTEL wing</td> <td>60</td> </tr> <tr> <td>ADMIN wing to MEDITATION wing</td> <td>100</td> </tr> </table>	YOGA wing to ADMIN wing	50	YOGA wing to HOSTEL wing	70	YOGA wing to MEDITATION wing	50	ADMIN wing to HOSTEL wing	60	ADMIN wing to MEDITATION wing	100	
YOGA wing to ADMIN wing	50											
YOGA wing to HOSTEL wing	70											
YOGA wing to MEDITATION wing	50											
ADMIN wing to HOSTEL wing	60											
ADMIN wing to MEDITATION wing	100											

HOSTEL wing to MEDITATION wing	70
--------------------------------	----

Number of Computers installed at various locations are as follows:

HOSTEL	20
ADMIN	110
MEDITATION	45
YOGA	50



- (i) Suggest the most suitable wing out of the four to install the main server of this centre to get efficient connectivity. 1

Ans ADMIN (Maximum number of computers)

OR

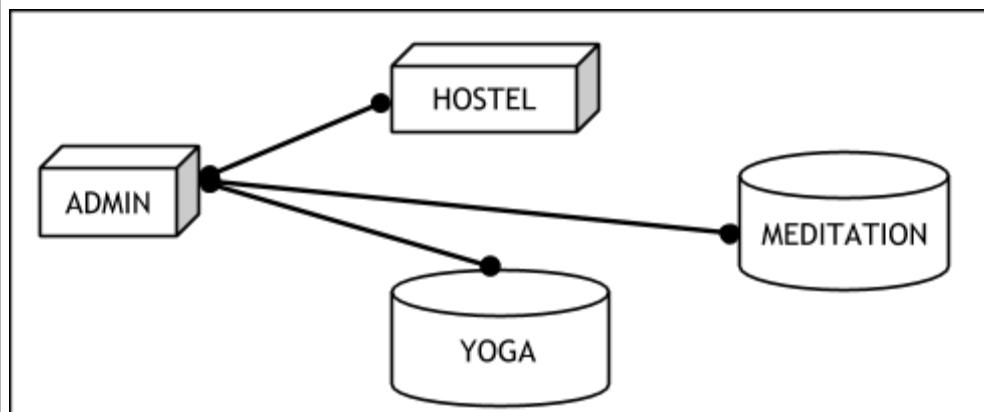
YOGA (Closest proximity to all buildings)

NOTE: Justification is optional

**(1 Mark for writing correct location)**

- (ii) Suggest by drawing the best cable layout for effective wing to wing network connectivity of all the wings of this centre. 1

Ans



OR

	<pre> graph TD     ADMIN[ADMIN] --- HOSTEL[HOSTEL]     HOSTEL --- YOGA[YOGA]     HOSTEL --- MEDITATION[MEDITATION]     YOGA --- MEDITATION   </pre>	
	<p><b>(1 Mark for drawing/writing the layout correctly)</b></p>	
(iii)	<p>Suggest, which device will be best suited for connecting multiple computer systems installed in each of the wings out of the following:</p> <ul style="list-style-type: none"> <li>• Modem</li> <li>• Switch</li> <li>• Gateway</li> <li>• Router</li> </ul>	1
Ans	Switch OR Modem OR Router	
	<p><b>(1 Mark for writing any/all correct device(s))</b></p>	
(iv)	<p>Suggest best communication medium to provide most efficient and effective connectivity between the wings out of the following:  <b>Co-axial Cable, Ethernet Cable, Optical Fibre, Single Pair Telephone Cable.</b></p>	1
Ans	Optical Fibre or Ethernet Cable	
	<p><b>(1 Mark for writing the correct network cable)</b></p>	

**Strictly Confidential: (For Internal and Restricted use only)**  
**Senior School Certificate Examination**  
**March 2019**  
**Marking Scheme - Computer Science (SUBJECT CODE 083)**  
**(SERIES: BVM PAPER CODE - 91)**

**General Instructions:**

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and the teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully. **Evaluation is a 10 -12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on the latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled.
5. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.
6. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
7. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
8. A full scale of marks **0 -70** has to be used. Please do not hesitate to award full marks if the answer deserves it.
9. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 25 answer books per day.
10. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
  - a. Leaving the answer or part thereof unassessed in an answer book.
  - b. Giving more marks for an answer than assigned to it.
  - c. Wrong transfer of marks from the inside pages of the answer book to the title page.
  - d. Wrong question wise totaling on the title page.
  - e. Wrong totaling of marks of the two columns on the title page.
  - f. Wrong grand total.
  - g. Marks in words and figures not tallying.
  - h. Wrong transfer of marks from the answer book to online award list.
  - i. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
  - j. Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

11. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as (X) and awarded zero (0) Marks.
12. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
13. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
14. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
15. The Board permits candidates to obtain a photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

**Specific Instructions:**

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying a similar meaning
- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, the number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

**SECTION A - (Only for candidates, who opted for C++)**

	1	(a) Write the names of any four fundamental data types of C++ .	2
		Ans <b>char, int, float, double, void (Any 4)</b>	
		<i>(½ Mark each for correctly naming a fundamental data type)</i>	
	(b) Write the names of the correct header files, which must be included in the following C++ code to compile the code successfully:  <b>void main()</b> <b>{</b> <b>    char L[]{"CS 2018";</b> <b>    int N=strlen(L);</b> <b>    cout&lt;&lt; L[N-1];</b> <b>}</b>		1
		Ans <b>string.h</b>	

		<b>iostream.h or iomanip.h or fstream.h</b>	
		<i>(½ Mark for writing each correct answer)</i> <b>NOTE:</b> Any additional header file to be ignored	
(c)	Rewrite the following C++ program after removing any/all syntactical error(s). Note: Assume all required header files are already included in the program.		2
	<pre>#define Area(L,B) = L*B structure Recta {     int Length, Breadth; }; void main() {     Recta R = [10,15];     cout&lt;&lt;Area(Length.R,Breadth.R); }</pre>		
Ans	<pre>#define Area(L,B) __L*B                               //Error 1 struct Recta   //Error 2 {     int Length, Breadth; }; void main() {     Recta R = {10,15};                                //Error 3     cout&lt;&lt;Area(R.Length,R.Breadth);                  //Error 4 }</pre>		
	<i>(½ Mark for correcting each Error and rewriting the statement correctly)</i> <b>NOTE:</b> <i>(1 Mark for correctly identifying all the four errors)</i> <i>(Ignore any other error pointed out)</i>		
(d)	Find and write the output of the following C++ program code: Note: Assume all required header files are already included in the program. <pre>void Alter(char *S1, char *S2) {     char *T;     T=S1;     S1=S2;     S2=T;     cout&lt;&lt;S1&lt;&lt;"&amp;"&lt;&lt;S2&lt;&lt;endl; } void main() {</pre>		2

		<pre> char X[]="First", Y[]="Second"; Alter(X,Y); cout&lt;&lt;X&lt;&lt;"*"&lt;&lt;Y&lt;&lt;endl; } </pre>	
	Ans	<b>Second&amp;First</b> <b>First*Second</b>	
		<p><i>(1 mark for each correct line of output)</i></p> <p><i>OR</i></p> <p><i>(½ Mark for writing partially correct value in accordance of the order)</i></p> <p><i>OR</i></p> <p><i>(Only ½ Mark for writing ‘&amp;’ and ‘*’ at proper places)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <i>Deduct only ½ Mark for not considering any or all correct placements of &amp; and *</i></li> <li>• <i>Deduct only ½ Mark for not considering any or all line break</i></li> </ul>	
	(e)	<p>Find and write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already included in the program.</p> <pre> void Convert(float &amp;X, int Y=2) {     X=X/Y;     Y=X+Y;     cout&lt;&lt;X&lt;&lt;"*"&lt;&lt;Y&lt;&lt;endl; } void main() {     float M=15, N=5;     Convert(M,N);     Convert(N);     Convert(M); } </pre>	3
	Ans	<b>3*8</b> <b>2.5*4</b> <b>1.5*3</b>	
		<p><i>(1 mark for each correct line of output)</i></p> <p><i>OR</i></p> <p><i>(½ Mark for writing partially correct value in accordance of the order)</i></p> <p><i>Only ½ Mark for writing all ‘*’ at proper places)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <i>Deduct only ½ Mark for not considering any or all correct placements of *</i></li> <li>• <i>Deduct only ½ Mark for not considering any or all line break</i></li> <li>• <i>Deduct only ½ mark for ignoring .5 in any or all lines</i></li> </ul>	

		<ul style="list-style-type: none"> <li><i>Writing 3.0 in the first line acceptable as correct answer</i></li> </ul>					
	(f)	<p>Observe the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the minimum and maximum values that can possibly be assigned to the variable <b>End</b>.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Assume all the required header files are already being included in the code.</li> <li>The function random(N) generates any possible integer between 0 and N-1 (both values included)</li> </ul> <pre>void main() {     randomize();     int A[]={10,20,30,40,50,60,70,80};     int Start = random(2) + 1;     int End = Start + random(4);     for(int I=Start; I&lt;=End , I++)         cout&lt;&lt;A[I]&lt;&lt;"\$"; }</pre> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">(i) 10\$20\$30\$</td> <td style="padding: 5px;">(ii) 20\$30\$40\$50\$60\$</td> </tr> <tr> <td style="padding: 5px;">(iii) 30\$40\$50\$60\$</td> <td style="padding: 5px;">(iv) 40\$50\$60\$70\$</td> </tr> </table>	(i) 10\$20\$30\$	(ii) 20\$30\$40\$50\$60\$	(iii) 30\$40\$50\$60\$	(iv) 40\$50\$60\$70\$	2
(i) 10\$20\$30\$	(ii) 20\$30\$40\$50\$60\$						
(iii) 30\$40\$50\$60\$	(iv) 40\$50\$60\$70\$						
	Ans	<p>(iii) 30\$40\$50\$60\$</p> <p><b>Minimum value = 1</b></p> <p><b>Maximum value = 5</b></p>					
		<p><b>Part 1:</b>  <i>(1 Mark for writing only the correct option)</i>  <b>OR</b>  <i>(1 Mark for identifying wrong syntax of for in the code)</i></p> <p><b>Part 2:</b>  <i>(½ Mark for writing correct Minimum value of End)</i>  <i>(½ Mark for writing correct Maximum value of End)</i></p>					
2.	(a)	<p>Given the following class Test and assuming all necessary header file(s) included, answer the questions that follow the code:</p> <pre>class Test {     int Marks; char TName[20]; public:     Test (int M) //Function 1     {         Marks = M;     }     Test (char S[]) //Function 2     {</pre>					

	<pre>         strcpy(TName, S);     } Test (char S[], int M)      //Function 3 {     Marks = M;     strcpy(TName, S); } Test (Test &amp;T)           //Function 4 {     Marks = T.Marks + 10;     strcpy(TName, T.TName); } void main() {     Test T1(10);          //Statement I     Test T2(70);          //Statement II     Test T3(30, "PRACTICAL"); //Statement III     _____;               //Statement IV } </pre>	
(i)	Which of the statement(s) out of (I), (II), (III), (IV) is/are incorrect for object(s) of the class Test?	1
Ans	<p><b>Statement III is incorrect</b></p> <p>OR</p> <p><b>Statement III and IV are incorrect</b></p>	
	<p><i>(1 mark for writing correct option)</i></p> <p><i>(½ mark for only writing Statement IV is incorrect)</i></p>	
(ii)	What is Function 4 known as ? Write the <b>Statement IV</b> , that would execute <b>Function 4</b> .	1
Ans	<ul style="list-style-type: none"> <li>• <b>Copy Constructor</b></li>   <li>• <b>Test T4=T1;</b> OR <b>Test T4(T1);</b></li> </ul> <p>OR</p> <p><b>Test T4=T2;</b> OR <b>Test T4(T2);</b></p> <p>OR</p> <p><b>Test T4=T3;</b> OR <b>Test T4(T3);</b></p>	
	<p><i>(½ mark for each correct answer)</i></p> <p><b>Note:</b> Any object name can be used in place of T4</p>	
(b)	<p>Observe the following C++ code and answer the questions (i) and (ii).</p> <p>Note: Assume all necessary files are included.</p> <pre> class Point {     int X,Y; public: </pre>	

	<pre> Point(int I=10, int J=20) //Function 1 {     X = J;     Y = I; } void Show() //Function 2 {     cout&lt;&lt;"Points are "&lt;&lt;X&lt;&lt;" &amp; "&lt;&lt;Y&lt;&lt;endl; } ~Point() //Function 3 {     cout&lt;&lt;"Points Erased "&lt;&lt;endl; } };  void main() {     Point P(5);     P.Show(); } </pre>	
(i)	For the class Point, what is <b>Function 3</b> known as ? When is it executed ?	1
Ans	<ul style="list-style-type: none"> <li>• Destructor</li> <li>• When the object goes out of scope OR mention of correct }</li> </ul>	
	<i>(½ Mark for each correct answer)</i>	
(ii)	What is the output of the above code, on execution ?	1
Ans	<b>Points are 20 &amp; 5</b> <b>Points Erased</b> <i>(½ Mark for each correct line of output)</i> <b>Note: No marks to be deducted for ignoring &amp;</b>	
	<b>OR</b>	
(b)	Explain Polymorphism in context of Object Oriented Programming. Also give a supporting example in C++.	2
Ans	When two or more functions have the same name with different signature , they are said to be overloaded. <b>OR</b> The ability of a message to be expressed in different forms. <b>Example:</b> <pre> void area(float r) {     cout&lt;&lt; 3.14*r*r; } </pre>	

	<pre> void area(int l,int b) {     cout&lt;&lt; l * b; } void main() { area(3.5);   area(10,20); } OR void area(float a); void area(int a, int b); </pre> <p>(1 mark for explaining Polymorphism correctly)  (1 mark for writing correct supporting example)</p> <p>OR</p> <p>(2 Marks for illustrating the concept of Polymorphism with the help of appropriate example)</p>									
(c)	<p>Write the definition of a class <b>GRAPH</b> in C++ with following description:</p> <p>Private Members</p> <ul style="list-style-type: none"> <li>• XUnit // integer</li> <li>• YUnit // integer</li> <li>• Type // char array of size 20</li> <li>• AssignType() /* Member function to assign value of Type based upon XUnit and YUnit as follows: */</li> </ul> <table border="1"> <thead> <tr> <th>Condition</th><th>Type</th></tr> </thead> <tbody> <tr> <td>XUnit = 0 Or YUnit = 0</td><td>None</td></tr> <tr> <td>XUnit is more than YUnit</td><td>Bar</td></tr> <tr> <td>XUnit is less than or equal to YUnit</td><td>Line</td></tr> </tbody> </table> <p>Public Members</p> <ul style="list-style-type: none"> <li>• InXY() /* Function to allow user to enter values of XUnit and YUnit and then invoke AssignType() to assign value of Type */</li> <li>• OutXY() //Function to display XUnit, YUnit and Type</li> </ul>	Condition	Type	XUnit = 0 Or YUnit = 0	None	XUnit is more than YUnit	Bar	XUnit is less than or equal to YUnit	Line	4
Condition	Type									
XUnit = 0 Or YUnit = 0	None									
XUnit is more than YUnit	Bar									
XUnit is less than or equal to YUnit	Line									
Ans	<pre> class GRAPH {     int XUnit, YUnit;     char Type[20];     void AssignType(); public :     void InXY();     void OutXY(); }; </pre>									

	<pre> void GRAPH::AssignType() {     if (XUnit==0  YUnit==0)         strcpy(Type,"None");     else if (XUnit&gt;YUnit)         strcpy (Type,"Bar");     else if (XUnit&lt;= YUnit)      // OR only else         strcpy(Type,"Line"); } void GRAPH::InXY() {     cin&gt;&gt;XUnit&gt;&gt;YUnit;     AssignType(); } void GRAPH::OutXY() {     cout&lt;&lt;XUnit&lt;&lt;YUnit&lt;&lt;Type&lt;&lt;endl; } </pre>	
	<p>(½ Mark for declaring class header correctly)  (½ Mark for declaring data members correctly)  (1 Mark for defining AssignType() correctly)  (½ Mark for taking inputs of XUnit and YUnit in InXY() )  (½ Mark for invoking AssignType() inside InXY())  (½ Mark for defining OutXY() correctly)  (½ Mark for correctly closing class declaration with a semicolon ; )</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Marks to be awarded for defining the member functions inside or outside the class</li> </ul>	
(d)	<p>Answer the questions (i) to (iv) based on the following:</p> <pre> class Ground {     int Rooms; protected:     void Put(); public:     void Get(); };  class Middle : private Ground {     int Labs; public:     void Take();     void Give(); };  class Top : public Middle {     int Roof; </pre>	4

	<pre> public:     void In();     void Out(); };  void main() {     Top T; } </pre>	
	(i) Which type of Inheritance out of the following is illustrated in the above example? – Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance	
Ans	(i) Multilevel Inheritance	
	<i>(1 Mark for writing correct option)</i>	
	(ii) Write the names of all the members, which are directly accessible by the member function Give() of class Middle.	
Ans	<b>Data Members : Labs</b> <b>Member Functions : Put(), Get(), Take(), Give() - optional</b>	
	<i>(1 Mark for writing all correct member names )</i> <b>NOTE:</b> <ul style="list-style-type: none"><li>• Marks not to be awarded for partially correct answer</li><li>• Separate specification as Data Members/Member Functions is optional</li></ul>	
	(iii) Write the names of all the members, which are directly accessible by the member function Out() of class Top.	
Ans	<b>Data Members : Roof</b> <b>Member Functions : Take(), Give(), In(), Out() - Optional</b>	
	<i>(1 Mark for writing all correct member names )</i> <b>NOTE:</b> <ul style="list-style-type: none"><li>• Marks not to be awarded for partially correct answer</li><li>• Separate specification as Data Members/Member Functions is optional</li></ul>	
	(iv) Write the names of all the members, which are directly accessible by the object T of class Top declared in the main() function.	
Ans	<b>Take(), Give(), In(), Out()</b>	
	<i>(1 Mark for writing all correct members )</i> <b>NOTE:</b> <i>Marks not to be awarded for partially correct answers.</i>	
	<b>OR</b>	
(d)	Consider the following class HeadQuarter <b>class HeadQuarter</b> {	4

	<pre> int Code; char Des[20]; protected: char Address[40]; public: void Get() {cin&gt;&gt;Code;gets(Des);gets(Address);} void Put() {cout&lt;&lt;Code&lt;&lt;Des&lt;&lt;Address&lt;&lt;endl;} };  Write a code in C++ to protectedly derive another class FrontOffice from the base class HeadQuarter with following members.  Data Members     Location of type character of size 10     Budget of type double Member Functions     A constructor function to assign Budget as 100000     Assign() to allow user to enter Location and Budget     Display() to display Location and Budget </pre>	
Ans	<pre> class FrontOffice : protected HeadQuarter {     char Location[10];     double Budget; public:     FrontOffice()     {         Budget= 100000;     }     void Assign()     {         gets(Location);         cin&gt;&gt;Budget;     }     void Display()     {         cout&lt;&lt; Location &lt;&lt;Budget&lt;&lt;endl;     } }; </pre>	
	<p>(½ Mark for declaring class FrontOffice)  (½ mark for inheriting using : )  (½ Mark for protected HeadQuarter)  (½ Mark for declaring data members correctly)  (1 Mark for defining constructor FrontOffice() correctly)  (½ Mark for defining Assign() correctly)  (½ Mark for defining Display() correctly)</p>	
3	<p>(a) Write a user-defined function NoTwoThree(int Arr[], int N) in C++, which should display the value of all such elements and their corresponding locations in the array Arr (i.e the array index), which are not multiples of 2 or 3. N represents the total number of elements in the array Arr, to be checked.</p> <p>Example: if the array Arr contains</p>	3

		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>25</td><td>8</td><td>12</td><td>49</td><td>9</td></tr> </table> <p>Then the function should display the output as:      25 at location 0      49 at location 3</p>	0	1	2	3	4	25	8	12	49	9															
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25	8	12	49	9																							
	Ans	<pre>void NoTwoThree(int Arr[],int N) {     for(int i=0;i&lt;N;i++)         if ((Arr[i]%2!=0) &amp;&amp; (Arr[i]%3!=0))             cout&lt;&lt;Arr[i]&lt;&lt;" at location "&lt;&lt;i&lt;&lt;endl; } OR void NoTwoThree(int Arr[],int N) {     for(int i=0;i&lt;N;i++)         if ((Arr[i]%2) &amp;&amp; (Arr[i]%3))             cout&lt;&lt;Arr[i]&lt;&lt;" at location "&lt;&lt;endl; }</pre>																									
		<i>(1/2 Mark for correctly writing the loop)</i> <i>(1/2 Mark for checking divisibility by 2)</i> <i>(1/2 Mark for checking divisibility by 3)</i> <i>(1/2 Mark for using &amp;&amp; operator between divisibility check)</i> <i>(1/2 Mark for displaying the element)</i> <i>(1/2 Mark for displaying the location)</i> <b>OR</b> <i>(Full 3 Marks for writing any correct code giving the same result)</i>																									
		<b>OR</b>																									
	(a)	<p>Write a user-defined function <b>ReArrange</b>(int <b>Arr</b>[], int <b>N</b>) in C++, which should swap the contents of the first half locations of the array <b>Arr</b> with the contents of the second half locations. <b>N</b> (which is an even integer) represents the total number of elements in the array <b>Arr</b>.</p> <p>Example:</p> <p>If the array <b>Arr</b> contains the following elements (for <b>N = 6</b>)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>12</td><td>5</td><td>7</td><td>23</td><td>8</td><td>10</td></tr> </table> <p>Then the function should rearrange the array to become</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>23</td><td>8</td><td>10</td><td>12</td><td>5</td><td>7</td></tr> </table> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• DO NOT DISPLAY the Changed Array contents</li> <li>• Do not use any other array to transfer the contents of array <b>Arr</b>.</li> </ul>	0	1	2	3	4	5	12	5	7	23	8	10	0	1	2	3	4	5	23	8	10	12	5	7	3
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	Ans	<pre>void ReArrange(int Arr[],int N) {</pre>																									

		<pre> for(int i=0;i&lt;N/2;i++) {     int t=Arr[i];     Arr[i]=Arr[N/2+i];     Arr[N/2+i]=t; } </pre>																																									
		<p>(½ Mark for initialisation, ½ Mark for correct condition, ½ Mark for change in value of variable of the loop as part of a loop)  (1 ½ Mark for swapping elements - ½ mark for each sub-step)  OR  (Full 3 Marks for writing a code giving the same result)</p>																																									
	(b)	<p>Write definition for a function <b>XOXO (char M[4][4])</b> in C++, which replaces every occurrence of an X with an O in the array, and vice versa.</p> <p>For example:</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th colspan="4">ORIGINAL ARRAY M</th> </tr> </thead> <tbody> <tr><td>X</td><td>X</td><td>O</td><td>X</td></tr> <tr><td>O</td><td>X</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>O</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>O</td><td>O</td></tr> </tbody> </table> <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th colspan="4">CHANGED ARRAY M</th> </tr> </thead> <tbody> <tr><td>O</td><td>O</td><td>X</td><td>O</td></tr> <tr><td>X</td><td>O</td><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td><td>O</td><td>O</td></tr> <tr><td>O</td><td>O</td><td>X</td><td>X</td></tr> </tbody> </table>	ORIGINAL ARRAY M				X	X	O	X	O	X	O	O	O	O	X	X	X	X	O	O	CHANGED ARRAY M				O	O	X	O	X	O	X	X	X	X	O	O	O	O	X	X	2
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	Ans	<pre> void XOXO(char M[4][4]) {     for(int i=0;i&lt;4;i++)         for(int j=0;j&lt;4;j++)             if (M[i][j]=='X')                 M[i][j]='O';             else if (M[i][j]=='O')                 M[i][j]='X'; } </pre>																																									
		<p>(½ Mark for correctly writing loop for traversing rows)  (½ Mark for correctly writing loop for traversing columns in each row)  (½ Mark for correctly replacing array element to 'X')  (½ Mark for correctly replacing array element to 'O')  OR  (Full 2 Marks for writing a code giving the same result)</p>																																									
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	(b)	<p>Write definition for a function <b>ColSwap(int A[4][4])</b> in C++, which swaps the contents of the first column with the contents of the third column.</p>	2																																								

		<p>For example:</p> <table border="1"> <thead> <tr> <th colspan="4">ORIGINAL ARRAY A</th> </tr> </thead> <tbody> <tr><td>10</td><td>15</td><td>20</td><td>25</td></tr> <tr><td>30</td><td>35</td><td>40</td><td>45</td></tr> <tr><td>50</td><td>55</td><td>60</td><td>65</td></tr> <tr><td>70</td><td>75</td><td>80</td><td>85</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="4">CHANGED ARRAY A</th> </tr> </thead> <tbody> <tr><td>20</td><td>15</td><td>10</td><td>25</td></tr> <tr><td>40</td><td>35</td><td>30</td><td>45</td></tr> <tr><td>60</td><td>55</td><td>50</td><td>65</td></tr> <tr><td>80</td><td>75</td><td>70</td><td>85</td></tr> </tbody> </table> <p>NOTE:</p> <ul style="list-style-type: none"> <li>• DO NOT DISPLAY the Changed Array contents</li> <li>• Do not use any other array to transfer the contents of array A.</li> </ul>	ORIGINAL ARRAY A				10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	CHANGED ARRAY A				20	15	10	25	40	35	30	45	60	55	50	65	80	75	70	85	
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		<p>(½ Mark for correctly writing loop)  (1 ½ Mark for swapping elements - ½ mark for each sub-step)  OR  (Full 2 Marks for writing a code giving the same result)</p>																																									
	(c)	<p>Let us assume P[20][10] is a two dimensional array, which is stored in the memory along the row with each of its elements occupying 2 bytes, find the address of the element P[10][5], if the address of the element P[5][2] is 25000.</p>	3																																								
	Ans	$\begin{aligned} \text{LOC}(P[10][5]) &= \text{LOC}(P[5][2]) + 2(10*(10-5)+(5-2)) \\ &= 25000 + 2(50 + 3) \\ &= 25000 + 2(53) \\ &= 25000 + 106 \\ &= 25106 \end{aligned}$ <p>OR</p> $\begin{aligned} \text{LOC}(P[I][J]) &= \text{Base}(P) + W * (\text{NC} * (I-\text{LBR}) + (J-\text{LBC})) \\ \text{Assuming LBR}=0, \text{LBC}=0 \\ \text{LOC}(P[5][2]) &= \text{Base}(P) + 2 * (10*5+2) \\ 25000 &= \text{Base}(P) + 2 * (50+2) \\ \text{Base}(P) &= 25000 - 2 * (52) \\ \text{Base}(P) &= 25000 - 104 \\ \text{Base}(P) &= 24896 \end{aligned}$ $\begin{aligned} \text{LOC}(P[10][5]) &= 24896 + 2 * (10*10+5) \\ &= 24896 + 2 * (105) \\ &= 24896 + 210 \\ &= 25106 \end{aligned}$																																									
		<p>(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)</p>																																									

	<p><i>(1 Mark for correct step calculations - at least one step of calculation) (1 Mark for final correct address)</i></p> <p><b>NOTE:</b> <i>Marks to be awarded for calculating the address assuming LBR and LBC = 1</i></p>	
	<b>OR</b>	
	<p>(c) Let us assume P[20][30] is a two dimensional array, which is stored in the memory along the column with each of its elements occupying 2 bytes. Find the address of the element P[5][6], if the base address of the array is 25000.</p>	3
	<p>Ans</p> <pre>LOC(P[I][J]) = Base(P) + W * ((I-LBR) + NR * (J-LBC)) Assuming LBR=0, LBC=0 LOC(P[5][6]) = Base(P) + 2 * (5 + 20 * 6)               = 25000 + 2 * (5 + 120)               = 25000 + 2 * (125)               = 25000 + 250               = 25250</pre>	
	<p><i>(1 Mark for writing correct formula (for Column major) OR substituting formula with correct values) (1 Mark for correct step calculations - at least one step of calculation) (1 Mark for final correct address)</i></p> <p><b>NOTE:</b> <i>Marks to be awarded for calculating the address assuming LBR and LBC = 1</i></p>	
	<p>(d) Write a user-defined function <b>Pop (Book B[], int &amp;T)</b>, which pops the details of a Book, from the static stack of Book B, at the location T (representing the Top end of the stack), where every Book of the stack is represented by the following structure:</p> <pre>struct Book {     int Bno;     char Bname[20]; };</pre>	4
	<p>Ans</p> <pre>void Pop(Book B[], int &amp;T) {     if(T!=-1) // OR if (T&gt;=0) OR if (T&gt;-1)     {         cout&lt;&lt;B[T].Bno&lt;&lt;B[T].Bname&lt;&lt;endl;         T--; // --T;     }     else         cout&lt;&lt;"Stack Empty"; }</pre> <p><b>OR</b></p> <pre>void Pop(Book B[], int &amp;T) {     if(T===-1) // OR if (T&lt;0)         cout&lt;&lt;"Stack Empty";</pre>	

```

        else
        {
            cout<<B[T].Bno<<B[T].Bname<<endl;
            T--;           // --T;
        }
    }
OR
void Pop(Book B[],int &T)
{
    if(T==0)
        cout<<"Stack Empty";
    else
    {
        T--;           // --T;
        cout<<B[T].Bno<<B[T].Bname<<endl;
    }
}

```

- (1 ½ Mark for checking EMPTY/NOT EMPTY condition)  
 (1 Mark for displaying/returning the content of Top element)  
 (1 ½ Mark for decrementing in the value of T or Top)  
**OR**  
 (Full 4 Marks for writing a code giving the same result)

**OR**

- (d) For the following structure of Books in C++

4

```

struct Book
{
    int Bno;
    char Bname[20];
    Book *Link;
};

Given that the following declaration of class BookStack in C++ represents a dynamic
stack of Books:
class BookStack
{
    Book *Top; //Pointer with address of Topmost Book of
                Stack
public:
    BookStack()
    {
        Top = NULL;
    }
    void Push(); //Function to push a Book into the dynamic
                 stack
    void Pop(); //Function to pop a Book from the dynamic
                 stack
    ~BookStack();
};

```

	<p>Write the definition for the member function void BookStack::Push(), that pushes the details of a Book into the dynamic stack of BookStack.</p>																					
Ans	<pre>void BookStack::Push() {     Book *T = new Book;     cin&gt;&gt;T-&gt;Bno;     gets(T-&gt;Bname);     T-&gt;Link = Top;     Top= T; }</pre>																					
	<p>(1 Mark for declaring and initialising T (Temporary Node) using new)          (1 Mark for allowing user to enter Bno and Bname of T)          (1 Mark for linking the T link pointer correctly with Top)          (1 Mark for assigning Top to T)</p>																					
(e)	<p>Evaluate the following Postfix expression, showing the stack contents:  <math>250, 45, 9, /, 5, +, 20, *, -</math></p>	2																				
Ans	<table border="1"> <thead> <tr> <th>Element</th><th>Stack Contents</th></tr> </thead> <tbody> <tr><td>250</td><td>250</td></tr> <tr><td>45</td><td>250, 45</td></tr> <tr><td>9</td><td>250, 45, 9</td></tr> <tr><td>/</td><td>250, 5</td></tr> <tr><td>5</td><td>250, 5, 5</td></tr> <tr><td>+</td><td>250, 10</td></tr> <tr><td>20</td><td>250, 10, 20</td></tr> <tr><td>*</td><td>250, 200</td></tr> <tr><td>-</td><td>50</td></tr> </tbody> </table> <p>Answer = 50</p> <p>OR          Any other method for evaluating the given postfix expression showing the status of Stack.</p>	Element	Stack Contents	250	250	45	250, 45	9	250, 45, 9	/	250, 5	5	250, 5, 5	+	250, 10	20	250, 10, 20	*	250, 200	-	50	
Element	Stack Contents																					
250	250																					
45	250, 45																					
9	250, 45, 9																					
/	250, 5																					
5	250, 5, 5																					
+	250, 10																					
20	250, 10, 20																					
*	250, 200																					
-	50																					
	<p>(½ Mark for correctly evaluating expression up to each operator)          OR          (1 Mark only to be given for writing correct answer without showing the Stack Status)</p>																					
	<b>OR</b>																					
(e)	<p>Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion:</p> $A + B * C ^ D - E$	2																				

Ans	$((A + (B * (C ^ D))) - E)$		
INFIX	STACK	POSTFIX	
(			
(			
A		A	
+	+	A	
(			
B	+	AB	
*	**	AB	
(	**	AB	
C	**	ABC	
^	**^	ABC	
D	**^	ABCD	
)	**	ABCD^	
)	+	ABCD^*	
)		ABCD^*+	
-	-	ABCD^*+	
E	-	ABCD^*+E	
)		ABCD^*+E-	

OR

A + B \* C ^ D - E

INFIX	STACK	POSTFIX
A		A
+	+	A
B	+	AB
*	**	AB
C	**	ABC
^	**^	ABC
D	**^	ABCD
-	-	ABCD^*+
E	-	ABCD^*+E
		ABCD^*+E-

OR

Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.

(*1/2 Mark for conversion upto each operator illustrating through stack*)

OR

(*1 Mark for only the final answer as ABCD^\*+E-*)

4.	<p>(a) A text file named <b>MESSAGE.TXT</b> contains some text. Another text file named <b>SMS.TXT</b> needs to be created such that it would store <b>only the first 150 characters</b> from the file <b>MESSAGE.TXT</b>.</p> <p>Write a user-defined function <b>LongToShort()</b> in C++ that would perform the above task of creating <b>SMS.TXT</b> from the already existing file <b>MESSAGE.TXT</b>.</p>	3
	<p>Ans</p> <pre> <b>void LongToShort()</b> {     <b>ifstream f1("MESSAGE.TXT");</b>     <b>ofstream f2("SMS.TXT");</b>     <b>int i=0;</b>     <b>char ch;</b>     <b>while(!f1.eof())</b>     {         <b>f1.get(ch);</b>         <b>i++;</b>         <b>if(i&lt;=150)</b>             <b>f2&lt;&lt;ch;</b>     }     <b>f1.close();</b>     <b>f2.close();</b> } </pre> <p><b>OR</b></p> <pre> <b>void LongToShort()</b> {     <b>ifstream f1("MESSAGE.TXT");</b>     <b>ofstream f2("SMS.TXT");</b>     <b>char ch;</b>     <b>for(int i=1;i&lt;=150;i++)</b>     {         <b>f1.get(ch);</b>         <b>f2.put(ch);</b>     }     <b>f1.close();</b>     <b>f2.close();</b> } </pre> <p><b>OR</b></p> <pre> <b>void LongToShort()</b> {     <b>ifstream f1("MESSAGE.TXT");</b>     <b>ofstream f2("SMS.TXT");</b>     <b>char s[200]; //Any array size &gt;=150 acceptable</b>     <b>f1.getline(s,151); // f1.getline(s,150);</b>     <b>f2&lt;&lt;s&lt;&lt;endl;</b>     <b>f1.close(); f2.close();</b> } </pre>	

	<p>(½ Mark for opening SMS.TXT correctly)  (½ Mark for opening MESSAGE.TXT correctly)  (1 Mark for reading each character /line (using any method) from the file)  (½ Mark for extracting 150 characters from MESSAGE.TXT)  (½ Mark for transferring the contents to the file SMS.TXT )</p>	
	<b>OR</b>	
(a)	<p>A text file named CONTENTS.TXT contains some text. Write a user-defined function LongWords() in C++ which displays all such words of the file whose length is more than 9 alphabets. For example: if the file CONTENTS.TXT contains:</p> <pre>"Conditional statements of C++ programming language are if and switch"</pre> <p>Then the function LongWords() should display the output as:</p> <pre>Conditional statements programming</pre>	3
Ans	<pre>void LongWords() {     ifstream f("CONTENTS.TXT");     char ch[20];     while(!f.eof())     {         f&gt;&gt;ch;         if(strlen(ch)&gt;9)// OR alphabet and length check             cout&lt;&lt;ch&lt;&lt;endl;     }     f.close(); }  OR  void LongWords() {     ifstream f("CONTENTS.TXT");     char ch[20];     while(f&gt;&gt;ch)     {   if(strlen(ch)&gt;9)// OR alphabet and length check         cout&lt;&lt;ch&lt;&lt;endl;     }     f.close(); }  OR  void LongWords() {     fstream f ("CONTENTS.TXT",ios::in);     char ch[20];     f&gt;&gt;ch;</pre>	

	<pre> while(!f.eof()) {     if(strlen(ch)&gt;9) // OR alphabet and length check         cout&lt;&lt;ch&lt;&lt;endl;     f&gt;&gt;ch; } f.close(); } </pre>	
	<p>(1 Mark for opening CONTENTS.TXT correctly)  (1 Mark for reading each word (using any method) from the file)  (½ Mark for checking the length of the word)  (½ Mark for correctly displaying the word)</p>	
(b)	<p>Write a user-defined function TotalPrice() in C++ to read each object of a binary file STOCK.DAT, and display the Name from all such records whose Price is above 150. Assume that the file STOCK.DAT is created with the help of objects of class Stock, which is defined below:</p> <pre> class Stock {     char Name[20]; float Price; public:     char* RName() { return Name; }     float RPrice() { return Price; } }; </pre>	2
Ans	<pre> void TotalPrice() {     ifstream f("STOCK.DAT",ios::binary); //OR ifstream f("STOCK.DAT",ios::binary ios::in); //OR ifstream f;f.open("STOCK.DAT",ios::binary ios::in);     Stock S;     while(f.read((char*)&amp;S,sizeof(S)))         if(S.RPrice()&gt;150)             cout&lt;&lt;S.RName()&lt;&lt;endl;     f.close(); } </pre>	
	<p>(½ Mark for opening STOCK.DAT correctly)  (½ Mark for reading each record from the file)  (½ Mark for checking price above 150)  (½ Mark for correctly displaying the name)</p>	
	<b>OR</b>	
(b)	<p>A binary file DOCTORS.DAT contains records stored as objects of the following class:</p> <pre> class Doctor {     int DNo;  char Name[20];  float Fees; public:     int *GetNo() { return DNo; } </pre>	2

		<pre> void Show() {     cout&lt;&lt;DNo&lt;&lt;" * "&lt;&lt;Name&lt;&lt;" * "&lt;&lt;Fees&lt;&lt;endl; };  Write definition for function Details(int N) in C++, which displays the details of the Doctor from the file DOCTORS.DAT, whose DNo matches with the parameter N passed to the function. </pre>													
	Ans	<pre> void Details(int N) {     ifstream f("DOCTORS.DAT",ios::binary); //OR ifstream f("DOCTORS.DAT",ios::binary ios::in); //OR ifstream f;f.open("DOCTORS.DAT",ios::binary ios::in);     Doctor D;     while(f.read((char*)&amp;D,sizeof(D)))         if(D.GetNo()==N)             D.Show();     f.close(); } </pre>													
		<p>(½ Mark for opening DOCTORS.DAT correctly)  (1 Mark for reading each record from the file)  (½ Mark for correctly invoking the Show() to display the record)  <b>NOTE: Full 2 marks if the error in return type has been explicitly mentioned</b></p>													
	(c)	<p>Find the output of the following C++ code considering that the binary file STOCK.DAT exists on the hard disk with the following 5 records for the class STOCK containing Name and Price.</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Price</th> </tr> </thead> <tbody> <tr> <td>Rice</td> <td>110</td> </tr> <tr> <td>Wheat</td> <td>60</td> </tr> <tr> <td>Cheese</td> <td>200</td> </tr> <tr> <td>Pulses</td> <td>170</td> </tr> <tr> <td>Sauce</td> <td>150</td> </tr> </tbody> </table> <pre> void main() {     fstream File;     File.open("STOCK.DAT",ios::binary ios::in);     Stock S;     for (int I=1; I&lt;=2; I++)     {         File.seekg((2*I-1)*sizeof(S));         File.read((char*)&amp;S, sizeof(S));         cout&lt;&lt;"Read : "&lt;&lt;File.tellg()/sizeof(S)&lt;&lt;endl;     }     File.close(); } </pre>	Name	Price	Rice	110	Wheat	60	Cheese	200	Pulses	170	Sauce	150	1
Name	Price														
Rice	110														
Wheat	60														
Cheese	200														
Pulses	170														
Sauce	150														
	Ans	<pre> Read : 2 Read : 4 </pre>													

	(½ Mark for displaying correct value 2 in first line) (½ Mark for displaying correct value 4 in second line)	
<b>Note: 1 mark to be given even if 2 and 4 are written</b>		
	<b>OR</b>	
(c)	Differentiate between seekg() and tellg().	1
Ans	<p><b>seekg():</b> This function takes the file get pointer to the specified byte in a file.</p> <p>Eg: f.seekg(30); // It takes a pointer to 30th byte.</p> <p><b>tellg():</b> This function returns the position of the current get pointer in terms of bytes in a file.</p> <pre>int n = f.tellg();</pre>	
	(½ Mark for writing usage of seekg()) (½ Mark for writing usage of tellg()) <b>OR</b> (1 Mark for illustrating the concept of seekg() and tellg() with the help of appropriate example)	

## SECTION B - [Only for candidates, who opted for Python]

1	(a)	Write the names of any four data types available in Python.	2
	Ans	<b>Numbers</b> <b>Integer</b> <b>Boolean</b> <b>Floating Point</b> <b>Complex</b> <b>None</b> <b>Sequences</b> <b>Strings</b> <b>Tuple</b> <b>List</b> <b>Sets</b> <b>Mappings</b> <b>Dictionary</b>	
( ½ mark each for writing correct data types)			
	(b)	Name the Python Library modules which need to be imported to invoke the following functions	1
		(i) <b>sqrt()</b> (ii) <b>start()</b>	
	Ans	(i) <b>math</b> (ii) <b>re</b>	
		(½ Mark for writing each correct Library module) Note: Ignore any other Library modules, if mentioned.	

	(c)	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.	2
		<pre> 250 = Number WHILE Number&lt;=1000:     if Number=&gt;750:         print Number         Number=Number+100     else:         print Number*2         Number=Number+50 </pre>	
	Ans	<pre> <u>Number</u> = 250 <u>while</u> Number&lt;=1000:     if Number<u>&gt;=</u>750:         print Number         Number = Number+100     <u>else</u>:         print Number*2         Number = Number+50 </pre>	
		<p><i>(½ Mark for each correction, not exceeding 2 Marks)</i></p> <p><i>OR</i></p> <p><i>(1 mark for identifying the errors, without suggesting corrections)</i></p>	
	(d)	Find and write the output of the following python code:	2
		<pre> Msg1="WeLcOME" Msg2="GUeSTS" Msg3=""  for I in range(0,len(Msg2)+1):     if Msg1[I]&gt;="A" and Msg1[I]&lt;="M":         Msg3=Msg3+Msg1[I]     elif Msg1[I]&gt;="N" and Msg1[I]&lt;="Z":         Msg3=Msg3+Msg2[I]     else:         Msg3=Msg3+"*" print Msg3 </pre>	
	Ans	G*L*TME	
		<p><i>( 1 Mark for characters - ½ for G and L , ½ for TME )</i></p> <p><i>(½ Mark for each * at proper places )</i></p>	
	(e)	Find and write the output of the following python code:	3
		<pre> def Changer(P,Q=10):     P=P/Q     Q=P%Q     print P,"#",Q     return P </pre>	

	<pre> A=200 B=20 A=Changer (A,B) print A,"\$",B B=Changer (B) print A,"\$",B A=Changer (A) print A,"\$",B </pre>					
	<b>Ans</b> <pre> 10 # 10 10 \$ 20 2 # 2 10 \$ 2 1 # 1 1 \$ 2 </pre>					
	<p>( <i>½ mark for each correct line of output</i> )</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <i>Deduct ½ Mark for not writing any or all '#' OR '\$' symbol(s)</i></li> <li>• <i>Deduct ½ Mark for not considering any or all line breaks at proper place(s)</i></li> </ul>					
	<p><b>(f)</b> What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the minimum values that can be assigned to each of the variables BEGIN and LAST.</p> <pre> import random  VALUES=[10,20,30,40,50,60,70,80]; BEGIN=random.randint(1,3) LAST =random.randint(BEGIN,4)  for I in range(BEGIN,LAST+1):     print VALUES[I],"-", </pre> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">(i) 30 - 40 - 50 -</td> <td style="padding: 5px;">(ii) 10 - 20 - 30 - 40 -</td> </tr> <tr> <td style="padding: 5px;">(iii) 30 - 40 - 50 - 60 -</td> <td style="padding: 5px;">(iv) 30 - 40 - 50 - 60 - 70 -</td> </tr> </table>	(i) 30 - 40 - 50 -	(ii) 10 - 20 - 30 - 40 -	(iii) 30 - 40 - 50 - 60 -	(iv) 30 - 40 - 50 - 60 - 70 -	2
(i) 30 - 40 - 50 -	(ii) 10 - 20 - 30 - 40 -					
(iii) 30 - 40 - 50 - 60 -	(iv) 30 - 40 - 50 - 60 - 70 -					
	<b>Ans</b> (i) 30-40-50-					
	<p>Minimum value for BEGIN:1          Minimum value for LAST:1</p> <p>(<i>1 Mark for writing the correct options</i>)</p> <p><i>NOTE: No marks to be awarded for writing any other option</i></p> <p>(<i>½ Mark for writing correct Minimum value of BEGIN</i>)          (<i>½ Mark for writing correct Minimum value of LAST</i>)</p>					

2	(a)	Write four features of object oriented programming.	2
	Ans	<p><b>Encapsulation:</b> combining of data and the functions associated with that data in a single unit</p> <p><b>DataHiding:</b> the mechanism of hiding the data of a class from the outside world</p> <p><b>Abstraction:</b> providing only essential information to the outside world and hiding their background details</p> <p><b>Inheritance:</b> forming a new class (derived class) from an existing class (called the base class).</p> <p><b>Polymorphism:</b> ability to use an operator or function in various forms.</p> <p><b>NOTE:</b> Any four from the above</p>	
		<i>(½ mark each for writing every correct OOP feature)</i>	
	(b)	<pre> class Box:                                #Line 1     L = 10                               #Line 2     Type="HARD"                           #Line 3     def __init__(self,T,TL=30):           #Line 4         self.Type = T                      #Line 5         self.L    = TL                      #Line 6     def Disp(self):                        #Line 7         print self.Type,Box.Type          #Line 8         print self.L,Box.L                #Line 9 B1=Box("SOFT",20)                         #Line 10 B1.Disp()                                 #Line 11 Box.Type="FLEXI"                           #Line 12 B2=Box("HARD")                            #Line 13 B2.Disp()                                 #Line 14 </pre>	2
		Write the output of the above Python code.	
	Ans	<p>SOFT HARD</p> <p>20 10</p> <p>HARD FLEXI</p> <p>30 10</p>	
		<i>(½ for writing each correct line of output)</i>	
		<i>Note: Deduct ½ Mark if end of lines not considered</i>	
		<b>OR</b>	
	(b)	<pre> class Target:                                #Line 1     def __init__(self):                      #Line 2         self.X = 20                          #Line 3         self.Y = 24                          #Line 4 </pre>	2

	<pre> def Disp(self):     print self.X,self.Y def __del__(self):     print "Target Moved" def One():     T=Target()     T.Disp() One() </pre>	#Line 5 #Line 6 #Line 7 #Line 8 #Line 9 #Line 10 #Line 11 #Line 12									
	(i)	What are Methods/functions mentioned in Line 2 and Line 7 specifically known as?									
	Ans	Line 2 - Constructor Line 7 - Destructor									
		( ½ Mark for correct name of Line 2 method ) ( ½ Mark for correct name of Line 7 method )									
	(ii)	Mention the line number of the statement, which will call and execute the method/function shown in Line 2.									
	Ans	Line 10									
		( 1 Mark for writing the correct line number 10 )									
	(c)	Define a class HOUSE in Python with following specifications:	4								
		<p><b>Instance Attributes</b></p> <ul style="list-style-type: none"> <li>- Hno # House Number</li> <li>- Nor # Number of Rooms</li> <li>- Type # Type of the House</li> </ul> <p><b>Methods/function</b></p> <ul style="list-style-type: none"> <li>- AssignType() # To assign Type of House # based on Number of Rooms as follows:</li> </ul> <table border="1"> <thead> <tr> <th>Nor</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>&lt;=2</td> <td>LIG</td> </tr> <tr> <td>==3</td> <td>MIG</td> </tr> <tr> <td>&gt;3</td> <td>HIG</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>- Enter() # To allow user to enter value of # Hno and Nor. Also, this method should # call AssignType() to assign Type</li> <li>- Display() # To display Hno, Nor and Type</li> </ul>	Nor	Type	<=2	LIG	==3	MIG	>3	HIG	
Nor	Type										
<=2	LIG										
==3	MIG										
>3	HIG										
	Ans	<pre> class HOUSE: # class HOUSE( ): / class HOUSE(Object):     def __init__(self): # def __init__(self,A,B,C):         self.Hno=0 # self.Hno=A         self.Nor=0 # self.Nor=B         self.Type="" # self.Type=C </pre>									

	<pre> def AssignType(self):     if self.Nor &lt;= 2:         self.Type="LIG"     elif self.Nor ==3:         self.Type="MIG"     else:         self.Type="HIG" def Enter(self):     self.Hno = input("Enter House Number")     self.Nor = input("Enter Number of rooms")     self.AssignType()      # OR      AssignType(self) def Display(self):     print self.Hno     print self.Nor     print self.Type </pre>	
	<p>(½ Mark for correct syntax for class header)  (½ Mark for correct declaration of instance attributes)  (1 Mark for correct definition of AssignType() function)  (1 Mark for correct definition of Enter() with proper invocation of AssignType( ))  (1 Mark for correct definition of Display())</p> <p><b>NOTE:</b>  Deduct ½ Mark if AssignType() is not invoked properly inside Enter() function</p>	
(d)	<p>Answer the questions (i) to (iii) based on the following:</p> <pre> class Furniture(object):          #Line 1     def __init__(self,Q):         #Line 2         self.Qty = Q     def GetMore(self,TQ):         #Line 3         self.Qty =self.Qty+TQ     def FRDisp(self):             #Line 4         print self.Qty class Fixture(object):            #Line 5     def __init__(self,TQ):        #Line 6         self.Qty=TQ     def GetMore(self,TQ):         #Line 7         self.Qty =self.Qty+TQ     def FXDisp(self):             #Line 8         print self.Qty class Flat(Furniture,Fixture):   #Line 9     def __init__(self,fno):       #Line 10         self.Fno=fno         Q=0         if self.Fno&lt;100:             Q=10 </pre>	

	<pre> else:     Q=20     Furniture.__init__(self,Q):#Line 11     Fixture.__init__(self,Q): #Line 12 def More(self,Q):     Furniture.GetMore(self,Q)     Fixture.GetMore(self,Q)  def FLDisp(self):           #Line 14     print self.Fno,     Furniture.FRDisp(self)     Fixture.FXDisp(self) FL=Flat(101)                #Line 15 FL.More(2) FL.FLDisp() </pre>	
(i)	Write the type of the inheritance illustrated in the above.	1
Ans	Multiple Inheritance	
	<i>(1 Mark for writing correct Inheritance type)</i>	
(ii)	Find and write the output of the above code.	2
Ans	101 24 24	
	<i>(½ Mark for writing each correct value of first line of output) (1 Mark for writing correct value of second line of output)</i>	
	<i>Note: Deduct ½ Mark if end of lines not considered</i>	
(iii)	What is the difference between the statements shown in Line 11 and Line 12 ?	1
Ans	Line 11 calls the constructor of the parent class Furniture Line 12 calls the constructor of the parent class Fixture	
	<i>( ½ mark for each correct answer)</i>	
	<i>OR</i>	
(d)	Define inheritance. Show brief python examples of Single Level, Multiple and Multilevel Inheritance.	4
Ans	The capability of one class to inherit the data and functions of another class is called as Inheritance. The class which inherits is called the child/ derived/ sub class and the class from which it inherits is called the Parent/ base/ super class.  Example of Single level Inheritance <b>class A:</b> <b>pass</b> <b>class B(A):</b>	

	<pre>     pass  <b>Example of Multiple Inheritance</b> <b>class A:</b>     pass <b>class B:</b>     pass <b>class C(A,B) :</b>     pass </pre> <pre> <b>Example of Multilevel Inheritance</b> <b>class A:</b>     pass <b>class B(A) :</b>     pass <b>class C(B) :</b>     pass </pre>	
	<p><i>(1 mark for definition of Inheritance. 1 mark each for correct examples of Single, Multiple and Multilevel Inheritance)</i></p>	
3	<p>(a) Consider the following randomly ordered numbers stored in a list 106, 104, 106, 102, 105, 10</p> <p>Show the content of list after the First, Second and Third pass of the selection sort method used for arranging in <b>ascending order</b>.</p> <p>Note: Show the status of all the elements after each pass very clearly encircling the changes.</p>	3
	<p><b>Ans</b></p> <p>106, 104, 106, 102, 105, 10</p> <p><b>I Pass</b>  <math>\textcircled{10}, \textcircled{104}, \textcircled{106}, \textcircled{102}, \textcircled{105}, \textcircled{106}</math></p> <p><b>II Pass</b>  <math>10, \textcircled{102}, \textcircled{106}, \textcircled{104}, \textcircled{105}, 106</math></p> <p><b>III Pass</b>  <math>10, 102, \textcircled{104}, \textcircled{106}, \textcircled{105}, 106</math></p>	
	<p><i>(1 mark for each correct pass)</i></p> <p><b>OR</b></p> <p><i>(2½ Marks to be awarded for all the correct passes without encircling)</i></p>	
	<b>OR</b>	
	<p>(a) Consider the following randomly ordered numbers stored in a list 106, 104, 106, 102, 105, 107</p> <p>Show the content of list after the First, Second and Third pass of the bubble sort method used for arranging in <b>descending order</b>.</p>	3

		Note: Show the status of all the elements after each pass very clearly encircling the changes.	
	Ans	<p>106, 104, 106, 102, 105, 107</p> <p><b>I Pass</b> 106, 106, 104, 105, 107, 102</p> <p><b>II Pass</b> 106, 106, 105, 107, 104, 102</p> <p><b>III Pass</b> 106, 106, 107, 105, 104, 102</p>	
		<p><i>(1 mark for each correct pass)</i></p> <p><b>OR</b></p> <p><i>(2½ Marks to be awarded for all the correct passes without encircling)</i></p>	
	(b)	<p>Write definition of a method/function <b>AddOddEven(VALUES)</b> to display sum of odd and even values separately from the list of VALUES.</p> <p>For example, If the VALUES contain [15, 26, 37, 10, 22, 13] The function should display <b>Even Sum:</b> 58 <b>Odd Sum:</b> 65</p>	3
	Ans	<pre>def AddOddEven(VALUES):     so=0     se=0     for i in VALUES:         if i%2==0:             se=se+i         else:             so=so+i     print "Even Sum:", se     print "Odd Sum:", so</pre> <p><b>OR</b></p> <pre>def AddOddEven(VALUES):     so=0     se=0     for i in range(6): # range(0, 6):         if VALUES[i]%2==0:             se=se+VALUES[i]         else:             so=so+VALUES[i]     print "Even Sum:", se     print "Odd Sum:", so</pre>	

	<p>( ½ mark for function header)          (½ mark for initializing so (sum odd) and se (sum even) with 0)          ( ½ mark for reading each element of the list using a loop)          ( ½ mark for checking whether the value is odd/even)          ( ½ mark for adding it to the sum )          ( ½ mark for printing or returning the value)</p>	
	<b>OR</b>	
(b)	<p>Write definition of a method/function <b>HowMany(ID,Val)</b> to count and display number of times the value of Val is present in the list ID.</p> <p>For example,          If the ID contains [115,122,137,110,122,113] and Val contains 122          The function should display  <b>122 found 2 Times</b></p>	3
Ans	<pre>def HowMany(ID,Val):     c=0     for i in ID:         if i==Val:             c=c+1     print Val,"found",c,"Times"</pre>	
	<p>( ½ mark for function header)          (½ mark for initializing c (count) with 0)          ( ½ mark for reading each element of the list using a loop)          ( ½ mark for checking whether i is equal to the Val)          ( ½ mark for increasing the value of c )          ( ½ mark for printing or returning the value)</p>	
(c)	<p>Write <b>QueueUp(Client)</b> and <b>QueueDel(Client)</b> methods/function Python to add a new Client and delete a Client from a List of Clients names, considering them to act as insert and delete operations of the Queue data structure.</p>	4
Ans	<pre>def QueueUp(queue):     a=input("enter client name: ")     queue.append(a) def QueueDel(queue):     if (queue==[]):         print "Queue empty"     else:         print "Deleted element is: ",queue[0]         del queue[0]</pre> <p>OR</p> <pre>class queue:     Client=[]     def QueueUp(self):         a=input("enter client name: ")         queue.Client.append(a)</pre>	

	<pre> def QueueDel(self):     if (queue.Client==[]):         print "Queue empty"     else:         print "Deleted element is: ",queue.Client[0]         del queue.Client[0] </pre> <p> <i>( ½ mark for QueueUp() header)</i>  <i>( ½ mark for accepting a value from user)</i>  <i>( ½ mark for adding value in list)</i>  <i>( ½ mark for QueueDel header)</i>  <i>( ½ mark for checking empty list condition)</i>  <i>( ½ mark for displaying “Queue empty”)</i>  <i>( ½ mark for displaying the value to be deleted)</i>  <i>( ½ mark for deleting value from list)</i> </p>	
	<i>OR</i>	
(c)	Write PushOn(Book) and Pop(Book) methods/functions in Python to add a new Book and delete a Book from a List of Book titles, considering them to act as push and pop operations of the Stack data structure.	4
Ans	<pre> def PushOn(Book) :     a=input("enter book title : ")     Book.append(a) def Pop(Book) :     if (Book==[]):         print "Stack empty"     else:         print "Deleted element:",Book.pop() </pre> <p>OR</p> <pre> class Stack:     Book=[]     def PushOn(self):         a=input("enter book title : ")         Stack.Book.append(a)     def Pop(self):         if (Stack.Book==[]):             print "Stack empty"         else:             print "Deleted element:",Stack.Book.pop() </pre>	
	<p> <i>( ½ mark for PushOn() header)</i>  <i>( ½ mark for accepting a value from user)</i>  <i>( ½ mark for adding value in list)</i>  <i>( ½ mark for Pop() header)</i>  <i>( ½ mark for checking empty list condition)</i>  <i>( ½ mark for displaying “Stack empty”)</i>  <i>( ½ mark for displaying the value to be deleted)</i>  <i>( ½ mark for deleting value from list)</i> </p>	
(d)	Write a python method/function Swapper(Numbers) to swap the first half of the	2

	<p>content of a list Numbers with second half of the content of list Numbers and display the swapped values.</p> <p>Note: Assuming that the list has even number of values in it</p> <p>For Example: If the list Numbers contain [35, 67, 89, 23, 12, 45]</p> <p>After swapping the list content should be displayed as [23, 12, 45, 35, 67, 89]</p>	
	<p>Ans</p> <pre>def Swapper(Numbers):     mid=len(Numbers)/2     for i in range(0,mid):         Numbers[i],Numbers[mid+i]=Numbers[mid+i],Numbers[i]     print Numbers</pre> <p>OR</p> <pre>def Swapper(Numbers):     mid=len(Numbers)/2     for i in range(0,mid):         T=Numbers[i]         Numbers[i]=Numbers[mid+i]         Numbers[mid+i]=T     print Numbers</pre>	
	<p>( ½ mark for function header)</p> <p>( ½ mark for loop)</p> <p>( ½ mark for swapping values)</p> <p>( ½ mark for displaying list)</p>	
	<i>OR</i>	
(d)	<p>Write a python method/function Count3and7(N) to find and display the count of all those numbers which are between 1 and N, which are either divisible by 3 or by 7. 2</p> <p>For Example: If the value of N is 15</p> <p>The sum should be displayed as 7 (as 3,6,7,9,12,14,15 in between 1 to 15 are either divisible by 3 or 7)</p>	
	<p>Ans</p> <pre>def Count3and7 (N) :     c=0     for i in range(1,N+1):         if i%3==0 or i%7==0:             c=c+1     print c</pre>	
	<p>( ½ mark for function header)</p> <p>( ½ mark for loop)</p>	

	( <i>½ mark for divisibility check and counting values</i> ) ( <i>½ mark for displaying list</i> )																												
(e)	Evaluate the following Postfix expression, showing the stack contents: $250, 45, 9, /, 5, +, 20, *, -$	2																											
Ans	<p>Element      Stack Contents</p> <table border="1"> <tr><td>250</td><td>250</td></tr> <tr><td>45</td><td>250, 45</td></tr> <tr><td>9</td><td>250, 45, 9</td></tr> <tr><td>/</td><td>250, 5</td></tr> <tr><td>5</td><td>250, 5, 5</td></tr> <tr><td>+</td><td>250, 10</td></tr> <tr><td>20</td><td>250, 10, 20</td></tr> <tr><td>*</td><td>250, 200</td></tr> <tr><td>-</td><td>50</td></tr> </table> <p>Answer = 50</p> <p>OR Any other method for evaluating the given postfix expression showing the Stack Status.</p>	250	250	45	250, 45	9	250, 45, 9	/	250, 5	5	250, 5, 5	+	250, 10	20	250, 10, 20	*	250, 200	-	50										
250	250																												
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9	250, 45, 9																												
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+	250, 10																												
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*	250, 200																												
-	50																												
	<p>(<i>½ Mark for evaluation till each operator</i>)</p> <p>OR</p> <p>(<i>1 Mark for only writing the correct answer without showing stack status</i>)</p>																												
	<b>OR</b>																												
(e)	Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion: $A + B * C ^ D - E$	2																											
Ans	$((A + (B * (C ^ D))) - E)$ <table border="1"> <thead> <tr> <th>INFIX</th> <th>STACK</th> <th>POSTFIX</th> </tr> </thead> <tbody> <tr><td>(</td><td></td><td></td></tr> <tr><td>(</td><td></td><td></td></tr> <tr><td>A</td><td></td><td>A</td></tr> <tr><td>+</td><td>+</td><td>A</td></tr> <tr><td>(</td><td></td><td></td></tr> <tr><td>B</td><td>+</td><td>AB</td></tr> <tr><td>*</td><td>**</td><td>AB</td></tr> <tr><td>(</td><td>**</td><td>AB</td></tr> </tbody> </table>	INFIX	STACK	POSTFIX	(			(			A		A	+	+	A	(			B	+	AB	*	**	AB	(	**	AB	
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C	+*	ABC
^	+*^	ABC
D	+*^	ABCD
)	**	ABCD^
)	+	ABCD^*
)		ABCD^**
-	-	ABCD^**
E	-	ABCD^**E
)		ABCD^**E-

OR

A + B \* C ^ D - E

INFIX	STACK	POSTFIX
A		A
+	+	A
B	+	AB
*	**	AB
C	**	ABC
^	+*^	ABC
D	+*^	ABCD
-	-	ABCD^**
E	-	ABCD^**E
		ABCD^**E-

OR

Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.

(½ Mark for conversion upto each operator illustrating through stack)

OR

(1 Mark for only the final answer as ABCD^\*\*E-)

- 4 (a) Write a statement in Python to open a text file WRITEUP.TXT so that new content can be written in it. 1

Ans `file= open("WRITEUP.TXT", "w")`

OR

`file= open("WRITEUP.TXT", "w+")`

(1 mark for correct statement)

OR

- (a) Write a statement in Python to open a text file README.TXT so that existing content can be read from it. 1

Ans `file= open("README.TXT", "r")`

OR

		<pre>file= open("README.TXT", "r+") (1 mark for correct statement)</pre>	
	(b)	<p>Write a method/function <b>ISTOUPCOUNT()</b> in python to read contents from a text file WRITER.TXT, to count and display the occurrence of the word “IS” or “TO” or “UP”.</p> <p>For example: If the content of the file is</p> <hr/> <pre>IT IS UP TO US TO TAKE CARE OF OUR SURROUNDING. IT IS NOT POSSIBLE ONLY FOR THE GOVERNMENT TO TAKE RESPONSIBILITY</pre> <hr/> <p>The method/function should display <b>Count of IS TO and UP is 6</b></p>	2
	Ans	<pre>def ISTOUPCOUNT():     c=0     file=open('WRITER.TXT', 'r')     line = file.read()     word = line.split()     for w in word:         if w=="IS" or w=="TO" or w=="UP":             c=c+1     print "Count of IS TO and UP is ",c     file.close()</pre>	
		<p>(½ Mark for opening the file) (½ Mark for reading all lines, and dividing it into words) (½ Mark for checking condition and incrementing count) (½ Mark for displaying count)</p>	
		<b>OR</b>	
	(b)	<p>Write a method/function <b>AEDISP()</b> in python to read lines from a text file WRITER.TXT, and display those lines, which are starting either with A or starting with E.</p> <p>For example: If the content of the file is</p> <hr/> <pre>A CLEAN ENVIRONMENT IS NECESSARY FOR OUR GOOD HEALTH. WE SHOULD TAKE CARE OF OUR ENVIRONMENT. EDUCATIONAL INSTITUTIONS SHOULD TAKE THE LEAD.</pre> <hr/> <p>The method should display <b>A CLEAN ENVIRONMENT IS NECESSARY FOR OUR GOOD HEALTH.</b> <b>EDUCATIONAL INSTITUTIONS SHOULD TAKE THE LEAD.</b></p>	2
	Ans	<pre>def AEDISP():     file=open('WRITER.TXT', 'r')     lines = file.readlines()</pre>	

	<pre> for w in lines:     if w[0]== "A" or w[0]== "E":         print w file.close() </pre> <p><i>(½ Mark for opening the file)  (½ Mark for reading all lines, and using loop)  (½ Mark for checking condition)  (½ Mark for printing lines)</i></p>	
(c)	<p>Considering the following definition of class STOCK, write a method/function COSTLY() in python to search and display Name and Price from a pickled file STOCK.DAT, where Price of the items are more than 1000.</p> <pre> class Stock:     def __init__(self,N,P):         self.Name=N         self.Price=P     def Show(self):         print self.Name , "@" , self.Price </pre>	3
Ans	<pre> def COSTLY():     S=STOCK()     file=open('STOCK.DAT' , 'rb')     try:         while True:             S=pickle.load(file)             if S.Price &gt; 1000:                 S.Show()     except EOFError:         pass     file.close() </pre> <p><i>(½ Mark for correct function header)  (½ Mark for opening the file STOCK.DAT correctly)  (½ Mark for correct loop)  (½ Mark for correct load())  (½ Mark for correct checking of Price)  (½ Mark for displaying the record)</i></p>	
	<p><i>Note: Marks should not be deducted if try except is not used</i></p>	
	<b>OR</b>	
(c)	<p>Considering the following definition of class DOCTORS, write a method/function SPLDOCS() in python to search and display all the content from a pickled file DOCS.DAT, where Specialisation of DOCTORS is “CARDIOLOGY”.</p> <pre> class DOCTORS:     def __init__(self,N,S):         self.Name=N         self.Specialisation=S     def Disp(self):         print self.Name , "#" , self.Specialisation </pre>	3

	<pre>Ans def SPLDOCS():     D=DOCTORS()     file=open('DOCS.DAT','rb')     try:         while True:             D=pickle.load(file)             if D.Specialisation == 'CARDIOLOGY':                 D.Disp()     except EOFError:         pass     file.close()</pre>	
	<p>(½ Mark for correct function header)  (½ Mark for opening the file DOCS.DAT correctly)  (½ Mark for correct loop)  (½ Mark for correct load())  (½ Mark for correct checking of Specialisation)  (½ Mark for displaying the record)</p> <p><i>Note: Marks should not be deducted if try except is not used</i></p>	

### SECTION C - (For all the candidates)

5      Write SQL queries for (i) to (iv) and write outputs for SQL queries (v) to (viii), which are based on the table given below: 8

Table: TRAINS

TNO	TNAME	START	END
11096	Ahimsa Express	Pune Junction	Ahmedabad Junction
12015	Ajmer Shatabdi	New Delhi	Ajmer Junction
1651	Pune Hbj Special	Pune Junction	Habibganj
13005	Amritsar Mail	Howrah Junction	Amritsar Junction
12002	Bhopal Shatabdi	New Delhi	Habibganj
12417	Prayag Raj Express	Allahabad Junction	New Delhi
14673	Shaheed Express	Jaynagar	Amritsar Junction
12314	Sealdah Rajdhani	New Delhi	Sealdah
12498	Shane Punjab	Amritsar Junction	New Delhi
12451	Shram Shakti Express	Kanpur Central	New Delhi
12030	Swarna Shatabdi	Amritsar Junction	New Delhi

Table: PASSENGERS

PNR	TNO	PNAME	GENDER	AGE	TRAVELDATE
P001	13005	R N AGRAWAL	MALE	45	2018-12-25
P002	12015	P TIWARY	MALE	28	2018-11-10
P003	12015	S TIWARY	FEMALE	22	2018-11-10

P004	12030	S K SAXENA	MALE	42	2018-10-12
P005	12030	S SAXENA	FEMALE	35	2018-10-12
P006	12030	P SAXENA	FEMALE	12	2018-10-12
P007	13005	N S SINGH	MALE	52	2018-05-09
P008	12030	J K SHARMA	MALE	65	2018-05-09
P009	12030	R SHARMA	FEMALE	58	2018-05-09

**NOTE:** All Dates are given in 'YYY-MM-DD' format

- (i) To display details of all Trains which Start from New Delhi

Ans **SELECT \* FROM TRAINS WHERE START='New Delhi' ;**

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (ii) To display the PNR, PNAME, GENDER and AGE of all Passengers whose AGE is below 50.

Ans **SELECT PNR, PNAME, GENDER, AGE  
FROM PASSENGERS WHERE AGE < 50 ;**

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (iii) To display total number of MALE and FEMALE Passengers .

Ans **SELECT GENDER, COUNT(\*)  
FROM PASSENGERS GROUP BY GENDER;  
OR  
SELECT GENDER, COUNT(GENDER)  
FROM PASSENGERS GROUP BY GENDER;**

*(½ Mark for correct SELECT statement)  
(½ Mark for correct GROUP BY/additional COUNT clause)*

- (iv) To display details of all Passengers travelling in Trains whose TNO is 12015

Ans **SELECT \* FROM PASSENGERS  
WHERE TNO=12015 ;**

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (v) **SELECT MAX(TRAVELDATE), MIN(TRAVELDATE) FROM PASSENGERS  
WHERE GENDER = 'FEMALE' ;**

Ans **MAX(TRAVELDATE) MIN(TRAVELDATE)**  
2018-11-10 2018-05-09

*(½ Mark for correct MAX(TRAVELDATE))  
(½ Mark for correct MIN(TRAVELDATE))*

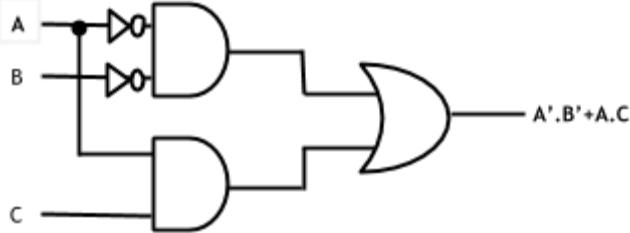
	(vi)	<pre>SELECT END, COUNT(*) FROM TRAINS GROUP BY END HAVING COUNT(*)&gt;1;</pre>																																																																									
	Ans	<table> <thead> <tr> <th><u>END</u></th> <th><u>COUNT (*)</u></th> </tr> </thead> <tbody> <tr> <td>Habibganj</td> <td>2</td> </tr> <tr> <td>Amritsar Junction</td> <td>2</td> </tr> <tr> <td>New Delhi</td> <td>4</td> </tr> </tbody> </table>	<u>END</u>	<u>COUNT (*)</u>	Habibganj	2	Amritsar Junction	2	New Delhi	4																																																																	
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	(vii)	<pre>SELECT DISTINCT TRAVELDATE FROM PASSENGERS;</pre>																																																																									
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6	(a)	State any one Distributive Law of Boolean Algebra and verify it using truth table.	2																																																																								
	Ans	<p>Distributive Law:  <math>A+BC=(A+B)(A+C)</math>          Verification using truth table</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>BC</th> <th>A+BC</th> <th>A+B</th> <th>A+C</th> <th><math>(A+B) . (A+C)</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p>OR  <math>A(B+C)=AB+AC</math>          Verification using truth table</p>	A	B	C	BC	A+BC	A+B	A+C	$(A+B) . (A+C)$	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	
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0	0	0	0	0	0	0	0																																																																				
0	0	1	0	0	0	1	0																																																																				
0	1	0	0	0	1	0	0																																																																				
0	1	1	1	1	1	1	1																																																																				
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1	0	1	0	1	1	1	1																																																																				
1	1	0	0	1	1	1	1																																																																				
1	1	1	1	1	1	1	1																																																																				

A	B	C	B+C	A. (B+C)	A.B	A.C	AB+AC
0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	0	0	0	0
1	0	0	0	0	0	0	0
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

(1 Mark for stating any one Distributive Law correctly)  
 (1 Mark for correctly verifying the stated Law using Truth Table)

- (b) Draw the Logic Circuit of the following Boolean Expression: 2  
 $A' \cdot B' + A \cdot C$

Ans



(Full 2 Marks for drawing the Logic Circuit for the expression correctly)  
 OR  
 (½ Mark for drawing Logic circuit for  $(A' \cdot B')$  correctly)  
 (½ Mark for drawing Logic circuit for  $(A \cdot C)$  correctly)

- (c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table: 1

X	Y	Z	F(X, Y, Z)
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

Ans  $F(X, Y, Z) = (X+Y+Z') \cdot (X+Y'+Z') \cdot (X'+Y+Z) \cdot (X'+Y'+Z')$   
 OR  
 $F(X, Y, Z) = \Pi(1, 3, 6, 7)$

(1 Mark for correctly writing the POS form)  
 OR  
 (½ Mark for any two correct terms)  
 Note: Deduct ½ mark if wrong variable names are written in the expression

	(d)	Reduce the following Boolean Expression to its simplest form using K-Map:	3																																																		
		$F(P, Q, R, S) = \sum(0, 1, 2, 3, 5, 6, 7, 10, 14, 15)$																																																			
	Ans	<p>K-Map for <math>P, Q, R, S</math>:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th><math>P'Q'</math></th> <th><math>P'Q</math></th> <th><math>PQ</math></th> <th><math>PQ'</math></th> </tr> <tr> <th><math>R'S'</math></th> <td>1 0</td> <td>4</td> <td>12</td> <td>8</td> </tr> <tr> <th><math>R'S</math></th> <td>1 1</td> <td>5</td> <td>13</td> <td>9</td> </tr> <tr> <th><math>RS</math></th> <td>1 3</td> <td>1</td> <td>15</td> <td>11</td> </tr> <tr> <th><math>RS'</math></th> <td>1 2</td> <td>1 6</td> <td>1 14</td> <td>1 10</td> </tr> </table> <p>Minimal expression : <math>P'Q' + RS' + QR + P'S</math> OR</p> <p>K-Map for <math>P, Q, R, S</math>:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th><math>R'S'</math></th> <th><math>R'S</math></th> <th><math>RS</math></th> <th><math>RS'</math></th> </tr> <tr> <th><math>P'Q'</math></th> <td>1 0</td> <td>1 1</td> <td>1 3</td> <td>1 2</td> </tr> <tr> <th><math>P'Q</math></th> <td>4</td> <td>1 5</td> <td>1 7</td> <td>1 6</td> </tr> <tr> <th><math>PQ</math></th> <td>12</td> <td>13</td> <td>1 15</td> <td>1 14</td> </tr> <tr> <th><math>PQ'</math></th> <td>8</td> <td>9</td> <td>11</td> <td>1 10</td> </tr> </table> <p>Minimal expression : <math>P'Q' + RS' + QR + P'S</math></p>		$P'Q'$	$P'Q$	$PQ$	$PQ'$	$R'S'$	1 0	4	12	8	$R'S$	1 1	5	13	9	$RS$	1 3	1	15	11	$RS'$	1 2	1 6	1 14	1 10		$R'S'$	$R'S$	$RS$	$RS'$	$P'Q'$	1 0	1 1	1 3	1 2	$P'Q$	4	1 5	1 7	1 6	$PQ$	12	13	1 15	1 14	$PQ'$	8	9	11	1 10	
	$P'Q'$	$P'Q$	$PQ$	$PQ'$																																																	
$R'S'$	1 0	4	12	8																																																	
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$RS'$	1 2	1 6	1 14	1 10																																																	
	$R'S'$	$R'S$	$RS$	$RS'$																																																	
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$PQ$	12	13	1 15	1 14																																																	
$PQ'$	8	9	11	1 10																																																	
		<p>(½ Mark for plotting the 1s in K Map correctly)  (½ Mark each for 4 groupings)  (½ Mark for writing final expression in reduced/minimal form)  Note: Deduct ½ mark if wrong variable names are used</p>																																																			
7	(a)	<p>Damodar Mohan has been informed that there had been a backdoor entry to his computer, which has provided access to his system through a malicious user/programs, allowing confidential and personal information to be subjected to theft. It happened because he clicked a link provided in one of the pop-ups from a website announcing him to be winner of prizes worth 1 Million Dollars. Which of the following has caused this out of the following?</p> <p>(i) Virus      (ii) Worm      (iii) Trojan Horse</p> <p>Also mention what he should do to prevent this infection.</p>	2																																																		
	Ans	<p>(iii) Trojan Horse or (i) Virus</p> <p>Use an antivirus application to prompt him about threats or avoid clicking on unverified links.</p>																																																			
		<p>(1 Mark for writing any correct answer Trojan Horse/Virus)  (1 Mark for writing any correct preventive measure)</p>																																																			

	(b) Tarini Wadhawa is in India and she is interested in communicating with her uncle in Australia. She wants to show one of her own designed gadgets to him and also wants to demonstrate its working without physically going to Australia. Which protocol out of the following will be ideal for the same? (i) POP3    (ii) SMTP    (iii) VoIP    (iv) HTTP	1																				
Ans	(iii) VoIP OR (iv) HTTP OR (ii) SMTP (if sent by mail) <i>(1 Mark for writing any/all correct answer(s))</i>																					
(c)	Give two differences between 3G and 4G telecommunication technologies.	1																				
Ans	<ul style="list-style-type: none"> <li>• Higher download/upload speeds in 4G compared to 3G</li> <li>• Greater bandwidth and flexibility in 4G compared to 3G</li> <li>• 3G is Voice+Data whereas 4G is only Data with voice overriding</li> </ul>																					
	<i>(½ Mark for writing each correct difference upto any two differences)</i>																					
(d)	Write the expanded names for the following abbreviated terms used in Networking and Communications: (i) MBPS    (ii) WAN    (iii) CDMA    (iv) WLL	2																				
Ans	<p>(i) MBPS - Mega Bytes per Second OR Mega Bits per second          (ii) WAN - Wide Area Network          (iii) CDMA - Code Division Multiple Access          (iv) WLL - Wireless in Local Loop</p>																					
	<i>(½ Mark each for writing correct expansion)</i>																					
(e)	Jonathan and Jonathan Training Institute is planning to set up its centre in Amritsar with four specialised blocks for Medicine, Management, Law courses along with an Admission block in separate buildings. The physical distances between these blocks and the number of computers to be installed in these blocks are given below. You as a network expert have to answer the queries raised by their board of directors as given in (i) to (iv).																					
	<p>Shortest distances between various locations in metres:</p> <table border="1"> <tbody> <tr> <td>Admin Block to Management Block</td> <td>60</td> </tr> <tr> <td>Admin Block to Medicine Block</td> <td>40</td> </tr> <tr> <td>Admin Block to Law Block</td> <td>60</td> </tr> <tr> <td>Management Block to Medicine Block</td> <td>50</td> </tr> <tr> <td>Management Block to Law Block</td> <td>110</td> </tr> <tr> <td>Law Block to Medicine Block</td> <td>40</td> </tr> </tbody> </table> <p>Number of Computers installed at various locations are as follows:</p> <table border="1"> <tbody> <tr> <td>Admin Block</td> <td>150</td> </tr> <tr> <td>Management Block</td> <td>70</td> </tr> <tr> <td>Medicine Block</td> <td>20</td> </tr> <tr> <td>Law Block</td> <td>50</td> </tr> </tbody> </table>	Admin Block to Management Block	60	Admin Block to Medicine Block	40	Admin Block to Law Block	60	Management Block to Medicine Block	50	Management Block to Law Block	110	Law Block to Medicine Block	40	Admin Block	150	Management Block	70	Medicine Block	20	Law Block	50	
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Management Block to Medicine Block	50																					
Management Block to Law Block	110																					
Law Block to Medicine Block	40																					
Admin Block	150																					
Management Block	70																					
Medicine Block	20																					
Law Block	50																					

	(i) Suggest the most suitable location to install the main server of this institution to get efficient connectivity.	1
Ans	<b>Admin Block</b>	
	<b>(1 Mark for writing correct location)</b>	
	(ii) Suggest the devices to be installed in each of these buildings for connecting computers installed within the building out of the following:	1
	<ul style="list-style-type: none"> <li>• Modem</li> <li>• Switch</li> <li>• Gateway</li> <li>• Router</li> </ul>	
Ans	<b>Switch OR Modem OR Router</b>	
	<b>(1 Mark for writing any/all correct device(s))</b>	
	(iii) Suggest by drawing the best cable layout for effective network connectivity of the blocks having server with all the other blocks.	1
Ans		
	<b>(1 Mark for drawing the any correct layout)</b>	
	(iv) Suggest the most suitable wired medium for efficiently connecting each computer installed in every building out of the following network cables:	1
	<ul style="list-style-type: none"> <li>• Coaxial Cable</li> <li>• Ethernet Cable</li> <li>• Single Pair Telephone Cable.</li> </ul>	
Ans	<b>Ethernet Cable</b>	
	<b>(1 Mark for writing the correct network cable)</b>	

**Roll No.**

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Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **16** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

## **COMPUTER SCIENCE**

*Time allowed : 3 hours**Maximum marks : 70****General Instructions :***

- (i) **SECTION A** refers to programming language C++.
- (ii) **SECTION B** refers to programming language Python.
- (iii) **SECTION C** is compulsory for all.
- (iv) Answer either **SECTION A** or **SECTION B**.
- (v) It is compulsory to mention on the page **1** in the answer book whether you are attempting **SECTION A** or **SECTION B**.
- (vi) All questions are compulsory within each section.

### **SECTION – A**

**(Only for Candidates, who opted for C++)**

1. (a) Write the type of C++ tokens (keywords and user defined identifiers) from the following : 2
- (i) case
  - (ii) \_delete
  - (iii) WHILE
  - (iv) 21stName

- (b) Jayneel has just started learning C++. He typed the following C++ code and during the compilation of the code, he got some errors. When Jayneel asked his teacher, the teacher told him to include necessary header files in the code. 1

Write the names of those header files, which Jayneel needs to include, for successful compilation and execution of the following code.

```
void main()
{
    cout <<"We win !"<<endl;
    cout <<strlen("The World")<<endl ;
}
```

- (c) Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all header files required in the code are already being included.

```
#define 10*Number MAX(Number)
void main()
{
    int Num, NewNum;
    cout<<"Number:" ;
    cin<<Num;
    if Num<10
        NewNum=MAX (Num) ;
    else
        NewNum=Num-2;
    cout<<"New Number:" <<NewNum<<endl;
}
```

- (d) Find and write the output of the following C++ program code : 2

Note : Assume all required header files are already included in the program.

```
void Decider(int &K,int L=70)
{
    if (K>L)
        K-=L;
    else
        K+=L;
}
void main()
{
```

```

        int M=100,N=40;
        Decider(M, N);
        cout<<M<<"#"<<N<<endl;
        Decider(M);
        cout<<N<<"#"<<M<<endl;
    }

```

- (e) Find and write the output of the following C++ program code : 3

Note : Assume all required header files are already being included in the program.

```

void DispScore(int S[],int N)
{
    for(int Count = 0;Count<N;Count++)
        cout<<S[Count]<<"#";
    cout<<endl;
}
void main()
{
    int *Point,Score[]={10,5,20,15};
    Point=Score;
    DispScore(Score,2);
    for(int Count=0; Count<4; Count++)
    {
        cout<<*Point<<":";
        if(Count%2==0)
            Point++;
        else
        {
            *Point +=10;
            Point++;
        }
    }
    cout<<endl;
    DispScore(Score,4);
}

```

- (f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables Low and High. 2

Note :

- Assume all the required header files are already being included in the code.
- The function random(n) generates an integer between 0 and n – 1.

```

void main()
{
    randomize();
    int Low=2+random(3), High=5+random(3);
    int C[] = "ABCDEFGHIJ";

    for(int I=Low; I<=High; I++)
        cout<<C[I];
    cout<<endl;
}

```

(i)	(ii)
<b>BCDE</b>	<b>CDEF</b>
(iii)	(iv)
<b>CDE</b>	<b>DCEFG</b>

2. (a) Differentiate between Data Hiding and Data Encapsulation in context of Object Oriented Programming. Also give a suitable example illustrating the same in C++. 2  
 (b) Observe the following C++ code and answer the questions (i) and (ii).

Note : Assume all necessary files are included.

```

class GAME
{
    int Pcode, Round, Score;

public:
    GAME ()                                //Member Function 1
    {
        Pcode=1; Round=0; Score=0;
    }
    GAME (GAME &G)                      //Member Function 2
    {
        Pcode=G.Pcode+1;
        Round=G.Round+2;
        Score=G.Score+10;
    }
};

void main()
{
    _____                                //Statement 1
    _____                                //Statement 2
}

```

- (i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class GAME ? 1
- (ii) Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively. 1
- (c) Write the definition of a class FRAME in C++ with following description : 4
- Private Members
- ```

- FID          // data member of integer type
- Height       // data member of float type
- Width        // data member of float type
- Amount        // data member of float type
- GetAmount()  // Member function to calculate and assign
               // Amount as 10*Height*Width

```
- Public Members
- ```

- GetDetail() // A function to allow user to enter values of
               // FID, Height, Width. This Function should
               // also call GetAmount() function to calculate
               // Amount

- DispDetail() // A function to display the
               // values of all data members

```
- (d) Answer the questions (i) to (iv) based on the following : 4
- ```

class DIGITAL
{
    int ID;
protected:
    float Amount;
    int Seconds;
public:
    DIGITAL();
    void Register(); void Disp();
};

class PRINT
{
    int PID;
protected:
    float Amount;
    int SQinch;
public:
    PRINT();
    void Get();
    void Print();
};

class MEDIA : Public PRINT, private DIGITAL
{
    int MID;
}

```

```

public:
    MEDIA();
    void Enter();
    void Print();
};

void main()
{
    MEDIA M;           //Statement 1
    _____;               //Statement 2
}

```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?  
 – Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
- (ii) Write the names of all the member functions, which are directly accessible by the object M of class MEDIA as declared in main( ) function.
- (iii) What will be the order of execution of the constructors, when the object M of class MEDIA is declared inside main ( ) ?
- (iv) Write Statement 2 to call function Print( ) of class PRINT from the object M of class MEDIA.

3. (a) Write the definition of a function MIXER(int A[], int N) in C++, which should multiply 2 to the odd values present in the array and multiply 3 to the even values present in the array. The entire content of the array A having N elements should change without using any other array. 2

Example : if the array Arr contains

|    |    |   |    |    |
|----|----|---|----|----|
| 23 | 20 | 5 | 11 | 10 |
|----|----|---|----|----|

Then the array should become

|    |    |    |    |    |
|----|----|----|----|----|
| 46 | 60 | 10 | 22 | 30 |
|----|----|----|----|----|

Note :

- The function should not display the content of the array.
- (b) Write definition for a function TOPBOTTOM(int M[][5],int N,int M) in C++, which finds and displays sum of the values in topmost row and sum of the values in bottommost row of a matrix M (Assuming the parameter N represents number of Row and the parameter M represents number of Columns). 3

For example, if the content of array M having N as 4 and M as 5 is as follows :

|    |    |    |    |    |
|----|----|----|----|----|
| 10 | 20 | 30 | 40 | 50 |
| 12 | 15 | 32 | 4  | 15 |
| 38 | 4  | 11 | 24 | 15 |
| 5  | 10 | 15 | 20 | 25 |

The function should find the sum and display the same as :

Sum of Top Row : 150

Sum of Bottom Row : 75

- (c) G[15][20] is a two dimensional array, which is stored in the memory along the column with each of its element occupying 4 bytes, find the address of the element G[5] [10], if the element G[2] [4] is stored at the memory location 52000. 3

- (d) Write the definition of a member function PUSHBOOK( ) in C++ to add information of BOOK in a static stack implemented using an array of structure BOOK (definition of struct BOOK is defined below for reference). 4

```
struct BOOK
{
    int BNO;
    char TITLE[20];
};
```

- (e) Evaluate the following Postfix expression showing the stack contents for each step of conversion. 2

50, 40, -, 4, 5, \*, +

4. (a) Write a function definition ARTICLES() in C++ to count all the articles “the”, “a” and “an” present in a text file “BOOK.TXT”. 3

Note : Ensure that “the”, “a” and “an” are counted as independent words and not as a part of any other word.

Example :

If the following is content in the file **BOOK.TXT** :

We should choose a low fat diet. The chef is really good in the hotel. An article came in the newspaper about him.

The function **ARTICLE()** should display the following output :

5

- (b) Write definition of a function CALSAL( ) in C++ to find the total salary paid to all the workers in a company. The worker's detail of this company is stored in a binary file WORKERS.DAT. 2

Assume that the file WORKERS.DAT is created with the help of objects of class WORKER, which is defined below :

```
class WORKER
{
    int WID; char Name[20];
    float Salary;
```

```

public:
    void INPUT()
    {
        cin>>WID; gets (Name) ; cin>>Salary;
    }
    void OUTPUT()
    {
        cout<<WID<<" :" <<Name<<endl;
        cout<<Salary<<endl;
    }
    float *GetSal() {return Salary; }
};

```

- (c) Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 350 products. **1**

```

class PRODUCT
{
    int PCode;char PName[20];
public:
    void Entry();void Disp();
};

void main()
{
    fstream In;
    In.open("PRODUCT.DAT",ios::binary|ios::in);
    PRODUCT P;
    In.seekg(0,ios::end);
    cout<<"Total Count: "<<In.tellg()/sizeof(P)<<endl;
    In.seekg(70*sizeof(P));
    In.read((char*)&P, sizeof(P));
    In.read((char*)&P, sizeof(P));
    cout<<"At Product:"<<In.tellg()/sizeof(P) + 1;
    In.close();
}

```

**SECTION – B**  
**(Only for Candidates, who opted for Python)**

1. (a) Which of the following can be used as valid variable identifier(s) in Python ? 2

- (i) **elif**
- (ii) **BREAK**
- (iii) **in**
- (iv) **\_Total**

(b) Name the Python Library modules which need to be imported to invoke the following functions : 1

- (i) **ceil()**
- (ii) **randint()**

(c) Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code. 2

```
NUM1=1234
1=DAY1
for C in range[1,4]:
    NUM+C=NUM1
    DAY1=DAY1+2
    print C
print NUM1:DAY1
```

(d) Find and write the output of the following Python code : 2

```
L1 = [100, 900, 300, 400, 500]
START = 1
SUM = 0
for C in range (START, 4):
    SUM = SUM + L1[C]
    print C,":",SUM
    SUM = SUM + L1[0]*10
    print SUM
```

(e) Find and write the output of the following Python code : 3

```
class BOX:
    def __init__(self,C=1,L=1,B=1,H=1): #constructor
        self.C=C
        self.L=L
        self.B=B;
        self.H=H;
    def New(self,Size):
        self.L = self.L + Size
        self.B = self.B + Size
    def Raise(self,Height):
        self.H = self.H + Height
    def Dimension(self):
        print self.C,":",self.L,"x",self.B,"x",self.H
B1=BOX()
B2=BOX(15,5,4)
B3=BOX(101,3,2,4)
B1.Raise(10)
```

```

B1.Dimension()
B3.New(5)
B3.Dimension()
B2.New(15)
B2.Dimension()

```

- (f) What are the possible outcome(s) executed from the following code ? Also specify the maximum and minimum values that can be assigned to variable N. 2

```

import random
PLAY=[40,50,10,20]"EAST", "WEST", "NORTH", "SOUTH";
ROUND=random.randint(2,3)
for J in range(ROUND,1,-1):
    print PLAY[J],":"

```

|            |                |
|------------|----------------|
| (i) 20:10: | (ii) 20:10:50: |
| (iii) 20:  | (iv) 40:50:20: |

2. (a) List four characteristics of Object Oriented Programming. 2  
 (b) **class ITEM:**

```

    Ino = 1
    Qty = 75
    def Get(self,I,Q):                      #function 1
        Ino = I
        Qty = Q
    def __init__(self,I,Q):                  #function 2
        self.Ino = I
        self.Qty = Q
    def Display(self):                      #function 3
        print self.Ino,self.Qty
    print Ino,Qty

```

- (i) Differentiate between function 1 and function 2 with respect to their execution.  
 (ii) Write statements, which will execute function 1 and function 2.

- (c) Define a class RING in Python with following specifications : 4

#### Instance Attributes

- RingID # Numeric value with a default value 101
- Radius # Numeric value with a default value 10
- Area # Numeric value

#### Methods :

- AreaCal() # Method to calculate Area as  
 #  $3.14 * \text{Radius} * \text{Radius}$
- NewRing() # Method to allow user to enter values of  
 # RingID and Radius. It should also  
 # Call AreaCal Method

```

- ViewRing() # Method to display all the Attributes
Instance Attributes
- FID          # data member of integer type
- Height       # data member of float type
- Width        # data member of float type
- Amount        # data member of float type
Methods :
- GetAmount()# Member function to calculate and assign
             # Amount as 10*Height*Width
- GetDetail()# A function to allow user to enter values of
             # FID, Height, Width. This function should
             # also call GetAmount() function to calculate
             # Amount
- DispDetail()# A function to display the
             # values of all data members

```

- (d) Write a program in Python to input a number and display its each digit reversed.

Example :

If the number is 6534

The program should display 4345

2

- (e) Write any two features that make it an important characteristic of Object Oriented Programming.

2

3. (a) What will be the status of the following list after the First, Second and Third pass of the bubble sort method used for arranging the following elements in **descending order** ?

3

Note : Show the status of all the elements after each pass very clearly underlining the changes.

**52, -10, 34, 60, -19, 20**

- (b) Write definition of a method **ZeroEndingSum(POINTS)** to add those values in the list of POINTS, which are ending with 0.

3

- (c) Write AddScore(GAME) and DelScore(GAME) methods in Python to Add a new SCORE in the list of scores of a GAME and Remove a SCORE from a list of scores of a GAME, considering these methods to act as PUSH and POP operations of the data structure Stack.

4

- (d) Write definition of a Method SEARCHNAME(MEMBERS, NAME) to search and display the serial number of first presence of a NAME from a list of MEMBERS. 2

For example :

If the list of MEMBERS contain

```
["ZAHEEN", "TOM", "CATHERINE", "AMIT", "HEENA"]
```

And

The NAME to search is "**CATHERINE**"

The following should get displayed

3

- (e) Evaluate the following Postfix notation of expression : 2

```
20, 30, +, 180, 20, 3, *, /, -
```

4. (a) Differentiate between file modes **r+** and **r** with respect to Python. 1

- (b) Write a method in Python to read lines from a text file NOTES.TXT, and count those lines, which are ending with '.' or ','. 2

- (c) Considering the following definition of class FURNITURE, write a method in Python to search and display the content in a pickled file COMPANY.DAT, where FTYPE is matching with the value 'HOME'. 3

```
class FURNITURE:
```

```
    def __init__(self, CODE, FTYPE, PRICE):
        self.CODE      = CODE
        self.FTYPE     = FTYPE
        self.PRICE     = 1000

    def Display(self):
        print self.CODE, ":", self.FTYPE, ":", self.PRICE
```

**SECTION – C**  
**(For all the Candidates)**

5. (a) Observe the following table CANDIDATE carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in OUTPUT ? Also, find the Degree and Cardinality of the OUTPUT. 2

**TABLE \_ A**

| NO | ALPHA |
|----|-------|
| C1 | X     |
| C2 | Y     |
| C3 | Z     |

**TABLE \_ B**

| CODE | VALUE |
|------|-------|
| 101  | 3000  |
| 102  | 4000  |

**OUTPUT**

| NO | ALPHA | CODE | VALUE |
|----|-------|------|-------|
| C1 | X     | 101  | 3000  |
| C1 | X     | 102  | 4000  |
| C2 | Y     | 101  | 3000  |
| C2 | Y     | 102  | 4000  |
| C3 | Z     | 101  | 3000  |
| C3 | Z     | 102  | 4000  |

- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables : 6

**TABLE : SALESPERSON**

| <b>Code</b> | <b>NAME</b>  | <b>SALARY</b> | <b>ITCODE</b> |
|-------------|--------------|---------------|---------------|
| 1001        | TANDEEP JHA  | 60000         | I2            |
| 1002        | YOGRAJ SINHA | 70000         | I5            |
| 1003        | TENZIN JACK  | 45000         | I2            |
| 1005        | ANOKHI RAJ   | 50000         | I7            |
| 1004        | TARANA SEN   | 55000         | I7            |

**TABLE : ITEM**

| <b>ITCODE</b> | <b>ITEMTYPE</b> | <b>TURNOVER</b> |
|---------------|-----------------|-----------------|
| I5            | STATIONARY      | 3400000         |
| I7            | HOSIERY         | 6500000         |
| I2            | BAKERY          | 10090000        |

- (i) To display the CODE and NAME of all SALESPERSON having “I7” Item Type Code from the table SALESPERSON.
- (ii) To display all details from table SALESPERSON in descending order of SALARY.
- (iii) To display the number of SALESPERSON dealing in each TYPE of ITEM. (Use ITCODE for the same)
- (iv) To display NAME of all the salespersons from the SALESPERSON table along with their corresponding ITEMTYPE from the ITEM table.
- (v) **SELECT MAX(SALARY) FROM SALESPERSON;**
- (vi) **SELECT DISTINCT ITCODE FROM SALESPERSON;**
- (vii) **SELECT CODE, NAME, I.ITCODE  
FROM SALESPERSON S, ITEM I  
WHERE S.ITCODE=I.ITCODE AND TURNOVER>=700000;**
- (viii) **SELECT SUM(SALARY) FROM SALESPERSON  
WHERE ITCODE="I2";**

6. (a) State Absorption Laws of Boolean Algebra and verify them using truth table. 2
- (b) Draw the Logic Circuit of the following Boolean Expression using only NOR Gates : 2
- A.  $B' + C$**

- (c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table : 1

| <b>A</b> | <b>B</b> | <b>C</b> | <b>F (A, B, C)</b> |
|----------|----------|----------|--------------------|
| 0        | 0        | 0        | 0                  |
| 0        | 0        | 1        | 1                  |
| 0        | 1        | 0        | 0                  |
| 0        | 1        | 1        | 1                  |
| 1        | 0        | 0        | 0                  |
| 1        | 0        | 1        | 0                  |
| 1        | 1        | 0        | 1                  |
| 1        | 1        | 1        | 1                  |

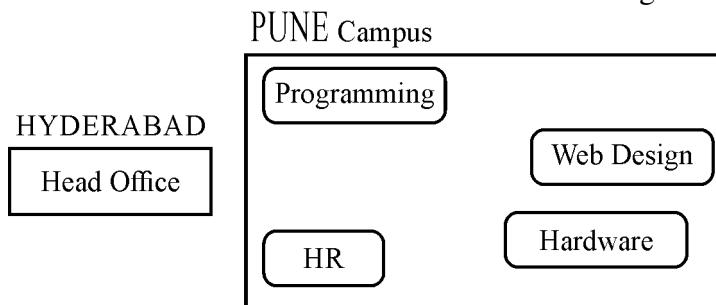
- (d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(P, Q, R, S) = \Sigma(0, 1, 2, 3, 4, 5, 6, 9, 13)$$

7. (a) Write one name of wireless and one wired communication medium. 2
- (b) Name any two private Internet Service Providers (company) in India. 2
- (c) Pratibha is an IT expert and a freelancer. She is undertakes those jobs, which are related to setting up security software/tools and managing networks in various companies. If we name her role in these companies, what it will be out of the following : 2
- (i) Cracker
  - (ii) Network Admin
  - (iii) Hacker
  - (iv) Operator (justify the reason for you chosen option)

- (d) Go-Fast corporation is a Hyderabad based company, which is planning to set up training campuses in various cities in next 3 years. Their first campus is coming up in Pune. At Pune campus, they are planning to have 4 different blocks for HR, Web Design Training, Programming Training and Hardware Training. Each block has number of computers, which are required to be connected in a network for communication, data and resource sharing.

As a network consultant of this company, you have to suggest the best network related solutions for them for issues/problems raised in (i) to (iv), keeping in mind the distances between various blocks/locations and other given parameters.



Shortest distances between various blocks/locations :

|                                       |            |
|---------------------------------------|------------|
| Programming Block to HR Block         | 60 metres  |
| Programming Block to Web Design Block | 50 metres  |
| Programming Block to Hardware Block   | 70 metres  |
| HR Block to Web Design Block          | 120 metres |
| HR Block to Hardware Block            | 85 metres  |
| HYDERABAD Head Office to PUNE Campus  | 504 Km     |

Number of Computers installed at various blocks are as follows :

|                   |     |
|-------------------|-----|
| HR Block          | 10  |
| Programming Block | 100 |
| Web Design Block  | 60  |
| Hardware          | 40  |

- (i) Suggest the most appropriate block/location to house the SERVER in the PUNE Campus (out of the 4 blocks) to get the best and effective connectivity. Justify your answer. **1**
- (ii) Suggest a device/software to be installed in the PUNE Campus to take care of data security. **1**
- (iii) Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various Blocks within the PUNE campus. **1**
- (iv) Suggest a device and the protocol that shall be needed to provide Video Conferencing solution between PUNE Campus and Hyderabad Head Office. **1**
-

**General Instructions:**

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

**SECTION A - (Only for candidates, who opted for C++)**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                      |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                      |   |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (a) Write the type of C++ tokens (keywords and user defined identifiers) from the following:<br><br>(i) <b>else</b> (ii) <b>Long</b> (iii) <b>4Queue</b> (iv) <b>_count</b>                                          | 2 |
| Ans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | (i) keyword    (ii) Identifier    (iii) None    (iv) Identifier<br><br>NOTE: Ignore (iii)                                                                                                                            |   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>(Full 2 Marks for ALL correct answers - (i), (ii) and (iv))</i><br><i>(1½ Mark for any TWO correct answers out of (i), (ii) and (iv))</i><br><i>(1 Mark for any ONE correct answer out of (i), (ii) and (iv))</i> |   |
| (b) The following C++ code during compilation reports errors as follows:<br><br>Error: 'ofstream' not declared<br>Error: 'strupr' not declared<br>Error: 'strcat' not declared<br>Error: 'FIN' not declared<br><br>Write the names of the correct header files, which must be included to compile the code successfully:<br><br><b>void main()</b><br>{<br><b>ofstream FIN("WISH.TXT");</b><br><b>char TEXT2[]="good day";</b><br><b>char TEXT1[]="John!";</b><br><br><b>strupr(TEXT2);</b><br><b>strcat(TEXT1, TEXT2);</b><br><b>FIN&lt;&lt;TEXT1&lt;&lt;endl;</b><br>} | 1                                                                                                                                                                                                                    |   |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|--|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | Ans | (i) <code>fstream</code> (ii) <code>string</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|  |     | <p align="center"><i>(½ Mark for writing each correct answer)</i></p> <p align="center"><i>NOTE: Any other header file to be ignored</i></p>                                                                                                                                                                                                                                                                                                                                                                                  |   |
|  | (c) | <p>Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.</p> <p><i>Note:</i> Assume all required header files are already included in the program.</p> <pre>typedef Count int; void main() {     Count C;     cout&lt;&lt;"Enter the count:";     cin&gt;&gt;C;     for (K = 1; K&lt;=C; K++)         cout&lt;&lt; C "*" K &lt;&lt; endl; }</pre>                                                                                                                         | 2 |
|  | Ans | <pre>typedef int Count;                                //Error 1, Error 2 void main() {     Count C;     int K;    //OR Count K;                      //Error 3     cout&lt;&lt;"Enter the count:";     cin&gt;&gt;C;     for (K = 1; K&lt;=C; K++)         //OR for (int K = 1; K&lt;=C; K++)      //Error 3         //OR for (Count K = 1; K&lt;=C; K++)   //Error 3         cout&lt;&lt; C &lt;&lt; "*" &lt;&lt; K &lt;&lt; endl;       //Error 4         //OR cout&lt;&lt;C * K&lt;&lt; endl;           //Error 4 }</pre> |   |
|  |     | <p align="center"><i>(½ Mark for correcting each correct Error)</i></p> <p align="center"><i>NOTE:</i></p> <p align="center"><i>(1 Mark for only identifying all the errors correctly)</i></p>                                                                                                                                                                                                                                                                                                                                |   |
|  | (d) | <p>Find and write the output of the following C++ program code:</p> <p><i>Note:</i> Assume all required header files are already included in the program.</p> <pre>void Revert(int &amp;Num, int Last=2) {     Last=(Last%2==0)?Last+1:Last-1;     for(int C=1; C&lt;=Last; C++)         Num+=C; }</pre>                                                                                                                                                                                                                      | 3 |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|--|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <pre> void main() {     int A=20,B=4;     Revert(A,B);     cout&lt;&lt;A&lt;&lt;"+"&lt;&lt;B&lt;&lt;endl;     B--;     Revert(A,B);     cout&lt;&lt;A&lt;&lt;"#"&lt;&lt;B&lt;&lt;endl;     Revert(B);     cout&lt;&lt;A&lt;&lt;"#"&lt;&lt;B&lt;&lt;endl; } </pre>                                                                                                                                                  |   |
|  | Ans | 35&4<br>38#3<br>38#9                                                                                                                                                                                                                                                                                                                                                                                               |   |
|  |     | <i>(½ Mark for writing each correct value)</i><br><b>OR</b><br><i>(Only ½ Mark for writing all ‘&amp;’ and ‘#’ at proper places)</i><br><b>Note:</b> <ul style="list-style-type: none"> <li>• Deduct only ½ Mark for not considering any or all correct placements of &amp; and #</li> <li>• Deduct only ½ Mark for not considering any or all line break</li> </ul>                                               |   |
|  | (e) | Find and write the output of the following C++ program code:<br><i>Note: Assume all required header files are already included in the program.</i><br><pre> #define Modify(N) N*3+10 void main() {     int LIST[]={10,15,12,17};     int *P=LIST, C;     for(C=3; C&gt;=0; C--)         LIST[I]=Modify(LIST[I]);     for (C=0; C&lt;=3; C++)     {         cout&lt;&lt;*P&lt;&lt;" :";         P++;     } } </pre> | 2 |
|  | Ans | Considering LIST[I] being replaced with LIST[C]<br>40 : 55 : 46 : 61 :                                                                                                                                                                                                                                                                                                                                             |   |
|  |     | <i>(½ Mark for writing each correct value)</i><br><b>Note:</b> <ul style="list-style-type: none"> <li>• Deduct ½ Marks if the values are written in reverse order</li> <li>• Full 2 marks for writing "undeclared variable I" / "Error" / "No Output". Ignore output if the error is mentioned.</li> </ul>                                                                                                         |   |

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|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                          |                       |                      |   |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------|-----------------------|----------------------|---|
|                       | <p>(f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the highest and lowest values that can be assigned in the array A.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>Assume all the required header files are already being included in the code.</li> <li>The function random(n) generates an integer between 0 and n-1.</li> </ul> <pre>void main() {     randomize();     int A[4], C;     for(C=0; C&lt;4; C++)         A[C]=random(C+1)+10;     for(C=3; C&gt;=0; C--)         cout&lt;&lt;A[C]&lt;&lt;"@"; }</pre> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">(i)<br/>13@10@11@10@</td><td style="padding: 5px;">(ii)<br/>15\$14\$12\$10\$</td></tr> <tr> <td style="padding: 5px;">(iii)<br/>12@11@13@10@</td><td style="padding: 5px;">(iv)<br/>12@11@10@10@</td></tr> </table> | (i)<br>13@10@11@10@ | (ii)<br>15\$14\$12\$10\$ | (iii)<br>12@11@13@10@ | (iv)<br>12@11@10@10@ | 2 |
| (i)<br>13@10@11@10@   | (ii)<br>15\$14\$12\$10\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                          |                       |                      |   |
| (iii)<br>12@11@13@10@ | (iv)<br>12@11@10@10@                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                          |                       |                      |   |
|                       | <p><b>Ans</b> (i) and (iv)<br/> <math>A_{\text{Min}} = 10 \quad A_{\text{Max}} = 13</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                          |                       |                      |   |
|                       | <p><i>(1 Mark for writing the correct options)</i><br/> <b>OR</b><br/> <i>(½ Mark for writing only option (i) OR only option (iv))</i><br/> <b>NOTE: No marks to be awarded for writing any other option or any other combination</b><br/> <i>(½ Mark for writing each correct Maximum and Minimum value in array A)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                          |                       |                      |   |
| 2.                    | <p>(a) Which function(s) out of the following can be considered as overloaded function(s) in the same program? Also, write the reason for not considering the other(s) as overloaded function(s).</p> <pre>void Execute(char A,int B); //Function 1 void Execute(int A,char B); //Function 2 void Execute(int P=10); //Function 3 void Execute(); //Function 4 int Execute(int A); //Function 5 void Execute(int &amp;K); //Function 6</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2                   |                          |                       |                      |   |
|                       | <p><b>Ans</b> Option [i]<br/>         Functions 1,2,3 are overloaded<br/> <br/> <b>Reason:</b> Function 4,5,6 would give ambiguity for Function 3<br/>         OR Any equivalent valid reason<br/> <b>OR</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                          |                       |                      |   |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     | <p>Option [ii]<br/>         Functions 1,2,4,5 are overloaded</p> <p>Reason: Function 3 and 6 not considered in this case because it would give redeclaration error for Function 5<br/>         OR Any equivalent valid reason</p> <p>OR</p> <p>Option [iii]<br/>         Functions 1,2,4,6 are overloaded</p> <p>Reason: Function 3 and 5 not considered in this case because it would give redeclaration error for Function 6<br/>         OR Any equivalent valid reason</p> |  |
|     | <p><i>(Full 2 Marks for any of the Options [i] / [ii] / [iii])</i></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <i>Deduct ½ Mark for not stating the reason</i></li> <li>• <i>1 Mark for partially correct answer</i></li> </ul> <p><b>OR</b></p> <p><i>(1 Mark for writing only any 2 Functions from Options [i] / [ii] / [iii])</i></p> <p><i>(1½ Mark for writing only any 3 Functions from Options [ii] / [iii])</i></p>                               |  |
| (b) | <p>Observe the following C++ code and answer the questions (i) and (ii).<br/> <i>Note: Assume all necessary files are included.</i></p> <pre> <b>class FIRST</b> {     int Num1; public:     void Display() //Member Function 1     {         cout&lt;&lt;Num1&lt;&lt;endl;     } };  <b>class SECOND: public FIRST</b> {     int Num2; public:     void Display() //Member Function 2     {         cout&lt;&lt;Num2&lt;&lt;endl;     } };  <b>void main()</b> { } </pre>     |  |

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|      |                                            | <pre>SECOND S ; _____ _____ }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                             |   |                                        |   |                                            |   |
|------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|---|----------------------------------------|---|--------------------------------------------|---|
|      | (i)                                        | Which Object Oriented Programming feature is illustrated by the definitions of classes FIRST and SECOND?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    |                             |   |                                        |   |                                            |   |
|      | Ans                                        | <b>Inheritance</b><br><b>OR</b><br><b>Encapsulation</b><br><b>OR</b><br><b>Data Abstraction</b><br><b>OR</b><br><b>Data Hiding</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                             |   |                                        |   |                                            |   |
|      |                                            | (1 Mark for writing any correct OOP feature from the given answers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                             |   |                                        |   |                                            |   |
|      | (ii)                                       | Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively using the object S.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1    |                             |   |                                        |   |                                            |   |
|      | Ans                                        | <b>S.FIRST::Display() //Statement 1</b><br><b>S.Display() //Statement 2</b><br><b>OR</b><br><b>S.SECOND::Display() //Statement 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                             |   |                                        |   |                                            |   |
|      |                                            | (½ Mark for writing correct Statement 1)<br>(½ Mark for writing correct Statement 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                             |   |                                        |   |                                            |   |
|      | (c)                                        | Write the definition of a class CONTAINER in C++ with the following description:<br>Private Members<br>- Radius, Height // float<br>- Type // int (1 for Cone, 2 for Cylinder)<br>- Volume // float<br>- CalVolume() // Member function to calculate<br>// volume as per the Type<br><table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Type</th> <th>Formula to calculate Volume</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>3.14 * \text{Radius} * \text{Height}</math></td> </tr> <tr> <td>2</td> <td><math>3.14 * \text{Radius} * \text{Height} / 3</math></td> </tr> </tbody> </table> Public Members<br>- GetValues() // A function to allow user to enter value<br>// of Radius, Height and Type. Also, call<br>// function CalVolume() from it.<br>- ShowAll() // A function to display Radius, Height,<br>// Type and Volume of Container | Type | Formula to calculate Volume | 1 | $3.14 * \text{Radius} * \text{Height}$ | 2 | $3.14 * \text{Radius} * \text{Height} / 3$ | 4 |
| Type | Formula to calculate Volume                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                             |   |                                        |   |                                            |   |
| 1    | $3.14 * \text{Radius} * \text{Height}$     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                             |   |                                        |   |                                            |   |
| 2    | $3.14 * \text{Radius} * \text{Height} / 3$ |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                             |   |                                        |   |                                            |   |
|      | Ans                                        | <b>class CONTAINER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                             |   |                                        |   |                                            |   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>     {         float Radius, Height;         int Type;         float Volume;         void CalVolume();     public:         void GetValues();         void ShowAll();     };      void CONTAINER::GetValues()     {         cin&gt;&gt;Radius&gt;&gt;Height&gt;&gt;Type ;         CalVolume();     }      void CONTAINER::ShowAll()     {         cout&lt;&lt;Radius&lt;&lt;Height&lt;&lt;Type&lt;&lt;Volume&lt;&lt;endl;     } }  void CONTAINER::CalVolume() {     if (Type == 1)         Volume=3.14*Radius*Height;     else if (Type == 2)         Volume=3.14*Radius*Height/3; } </pre> | <b>OR</b><br><pre> void CONTAINER::CalVolume() {     switch (Type)     {         case 1:             Volume =3.14*Radius*Height;             break;         case 2:             Volume=3.14*Radius*Height/3;     } } </pre> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

*(½ Mark for declaring class header correctly)  
 (½ Mark for declaring data members correctly)  
 (1 Mark for defining CalVolume() correctly)  
 (½ Mark for taking inputs of Radius, Type and Height in GetValues())  
 (½ Mark for invoking CalVolume() inside GetValues())  
 (½ Mark for defining ShowAll() correctly)  
 (½ Mark for correctly closing class declaration with a semicolon ; )*

**NOTE:**

- *Marks to be awarded for defining the member functions inside or outside the class*
- *Marks not to be deducted for replacing the Formulae for calculating*

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|      | <i>the Volumes with correct Formulae</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
| (d)  | <p>Answer the questions (i) to (iv) based on the following:</p> <pre>class Teacher {     int TCode; protected:     char Name[20]; public:     Teacher();     void Enter(); void Show(); };  class Course {     int ID; protected:     Char Title[30]; public:     Course();     void Initiate();     void Display(); };  class Schedule: public Course, private Teacher {     int DD,MM,YYYY; public:     Schedule();     void Start();     void View(); };  void main() {     Schedule S; }</pre> | 4 |
| (i)  | Which type of Inheritance out of the following is illustrated in the above example?<br>Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance                                                                                                                                                                                                                                                                                                                                      |   |
| Ans  | <b>Multiple Inheritance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|      | <i>(1 Mark for writing correct option)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| (ii) | Write the names of all the members, which are directly accessible by the member function View() of class Schedule.                                                                                                                                                                                                                                                                                                                                                                                 |   |
| Ans  | <pre>Start(), DD, MM, YYYY Display(), Initiate(), Title Enter(), Show(), Name View() // Optional</pre>                                                                                                                                                                                                                                                                                                                                                                                             |   |
|      | <i>(1 Mark for writing all correct member names )</i>                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |

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|    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |    |    |    |    |   |
|----|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|----|---|
|    |       | <b>NOTE:</b> <ul style="list-style-type: none"> <li>• Marks not to be awarded for partially correct answer</li> <li>• Ignore the mention of Constructors</li> </ul>                                                                                                                                                                                                                                                                                                                             |    |    |    |    |    |   |
|    | (iii) | Write the names of all the members, which are directly accessible by the object S of class Schedule declared in the main() function.                                                                                                                                                                                                                                                                                                                                                            |    |    |    |    |    |   |
|    | Ans   | <b>View()</b> , <b>Start()</b><br><b>Display()</b> , <b>Initiate()</b>                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |    |    |    |   |
|    |       | <i>(1 Mark for writing all correct member names )</i><br><b>NOTE:</b> <ul style="list-style-type: none"> <li>• Marks not to be awarded for partially correct answer</li> <li>• Ignore the mention of Constructors</li> </ul>                                                                                                                                                                                                                                                                    |    |    |    |    |    |   |
|    | (iv)  | What will be the order of execution of the constructors, when the object S of class Schedule is declared inside main() function?                                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |    |   |
|    | Ans   | <b>Course()</b> , <b>Teacher()</b> , <b>Schedule()</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |    |    |    |   |
|    |       | <i>(1 Mark for writing correct order)</i><br><b>NOTE:</b> <ul style="list-style-type: none"> <li>• No Marks to be awarded for any other combination/order.</li> <li>• Names of the constructor/class without parentheses is acceptable</li> </ul>                                                                                                                                                                                                                                               |    |    |    |    |    |   |
| 3  | (a)   | Write the definition of a function SumEO(int VALUES[], int N) in C++, which should display the sum of even values and sum of odd values of the array separately.<br>Example: if the array VALUES contains<br><table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>25</td> <td>20</td> <td>22</td> <td>21</td> <td>53</td> </tr> </table> Then the functions should display the output as:<br>Sum of even values = 42 (i.e 20+22)<br>Sum of odd values = 99 (i.e 25+21+53) | 25 | 20 | 22 | 21 | 53 | 2 |
| 25 | 20    | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 21 | 53 |    |    |    |   |
|    | Ans   | <pre>void SumEO(int VALUES[], int N) {     int SE = 0, SO = 0;     for (int I=0;I&lt;N;I++)     {         if(VALUES[I] %2 == 0)             SE += VALUES[I];         else             SO += VALUES[I];     }     cout&lt;&lt; "Sum of even values = " &lt;&lt; SE&lt;&lt;endl;     cout&lt;&lt; "Sum of odd values = " &lt;&lt; SO&lt;&lt;endl; }</pre> OR<br>Any other correct alternative code in C++                                                                                         |    |    |    |    |    |   |
|    |       | <i>(½ Mark for correctly writing the loop)</i><br><i>(½ Mark for adding even elements)</i>                                                                                                                                                                                                                                                                                                                                                                                                      |    |    |    |    |    |   |

|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|---|
|    |     | <i>(½ Mark for adding odd elements)<br/>     (½ Mark for displaying the sum of even and odd elements)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|    | (b) | <p>Write definition for a function <b>UpperHalf(int Mat[4][4])</b> in C++, which displays the elements in the same way as per the example shown below.</p> <p>For example, if the content of the array Mat is as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>25</td><td>24</td><td>23</td><td>22</td></tr> <tr><td>20</td><td>19</td><td>18</td><td>17</td></tr> <tr><td>15</td><td>14</td><td>13</td><td>12</td></tr> <tr><td>10</td><td>9</td><td>8</td><td>7</td></tr> </table> <p>The function should display the content in the following format:</p> <pre style="margin-left: 40px;">25 24 23 22 20 19 18 15 14 10</pre> | 25 | 24 | 23 | 22 | 20 | 19 | 18 | 17 | 15 | 14 | 13 | 12 | 10 | 9 | 8 | 7 | 3 |
| 25 | 24  | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 22 |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
| 20 | 19  | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 17 |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
| 15 | 14  | 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 12 |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
| 10 | 9   | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7  |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|    | Ans | <pre>void UpperHalf(int Mat[4][4]) {     for (int I=0;I&lt;4;I++)     {         for (int J=0;J&lt;4-I;J++)             cout&lt;&lt;MAT[I][J]&lt;&lt; " ";         cout&lt;&lt;endl;     } }</pre> <p>OR</p> <pre>void UpperHalf(int Mat[4][4]) {     for (int I=0;I&lt;4;I++)     {         for (int J=0;J&lt;4;J++)             if ((I+J)&lt;=3)                 cout&lt;&lt;MAT[I][J]&lt;&lt; " ";         cout&lt;&lt;endl;     } }</pre> <p>OR</p> <p>Any other correct alternative code in C++</p>                                                                                                                                                                   |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|    |     | <i>(½ Mark for correctly writing loop for traversing rows)<br/>     (½ Mark for correctly writing loop for traversing columns in each row)<br/>     (1 Mark for correctly checking elements for display)<br/>     (½ Mark for correctly displaying the selected elements)<br/>     (½ Mark for correctly displaying line break after each row)</i>                                                                                                                                                                                                                                                                                                                        |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |
|    | (c) | Let us assume Data[20][15] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 2 bytes, find the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3  |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|--|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | address of the element Data[10][5], if the element Data[15][10] is stored at the memory location 15000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|  | Ans | <pre> LOC(Data[10][5]) = LOC(Data[15][10]) + 2(15*(10-15)+(5-10))                   = 15000 + 2((-75) + (-5))                   = 15000 + 2(-80)                   = 15000 - 160                   = 14840 </pre> <p>OR</p> <pre> LOC(Data[I][J]) = Base(Data) + W * (NC * (I-LBR) + (J-LBC)) Taking LBR=0, LBC=0 LOC(Data[15][10]) = Base(Data) + 2 * (15*15+10) 15000          = Base(Data) + 2 * (15*15+10) Base(Data)      = 15000 - 2 * (235) Base(Data)      = 15000 - 470 Base(Data)      = 14530  LOC(Data[10][5]) = 14530 + 2 * (10*15+5)                   = 14530 + 2 * (155)                   = 14530 + 310                   = 14840 </pre> <p>OR</p> <pre> LOC(Data[I][J]) = Base(Data) + W * (NC * (I-LBR) + (J-LBC)) Taking LBR=1, LBC=1 LOC(Data[15][10]) = Base(Data) + 2 * (15*14+9) 15000          = Base(Data) + 2 * (15*14+9) Base(Data)      = 15000 - 2 * (219) Base(Data)      = 15000 - 438 Base(Data)      = 14562  LOC(Data[10][5]) = 14562 + 2 * (15*9+4)                   = 14562 + 2 * (139)                   = 14562 + 278                   = 14840 </pre> |   |
|  |     | <p>(1 Mark for writing correct formula (for Row major)<br/>         OR substituting formula with correct values)<br/>         (1 Mark for correct step calculations)<br/>         (1 Mark for final correct address)</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Marks to be awarded for calculating the address taking LBR and LBC = 1</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|  | (d) | <p>Write the definition of a member function AddPacket() for a class QUEUE in C++, to remove/delete a Packet from a dynamically allocated QUEUE of Packets considering the following code is already written as a part of the program.</p> <pre> <b>struct Packet</b> {     int PID; </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4 |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     | <pre>         char     Address[20];         Packet  *LINK;     };     class QUEUE     {         Packet *Front, *Rear;     public:         QUEUE () {Front=NULL;Rear=NULL ;}         void AddPacket();         void DeletePacket();         ~QUEUE ();     }; </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Ans | <pre> void QUEUE::AddPacket() {     if(Front != NULL)     {         Packet *T;         T=Front;         cout&lt;&lt;Front-&gt;PID&lt;&lt;Front-&gt;Address&lt;&lt;" removed"&lt;&lt;endl;         //OR cout&lt;&lt;T-&gt;PID&lt;&lt;T-&gt;Address&lt;&lt;" removed"&lt;&lt;endl;         Front = Front-&gt;LINK;         delete T;         if (Front==NULL)             Rear=NULL;     }     else         cout&lt;&lt; "Queue Empty"&lt;&lt;endl; } </pre> <p>OR</p> <p>Any other equivalent code in C++</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|     | <p>(1 Mark for checking EMPTY condition)<br/>         (½ Mark for declaring Packet T)<br/>         (½ Mark for assigning Front to T)<br/>         (½ Mark for deleting the previous Front Packet)<br/>         (½ Mark for changing LINK of Front)<br/>         (1 Mark for reassigning Rear with NULL if Queue becomes empty on deletion)</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Marks should not be deducted if function header is written as<br/> <code>void QUEUE::DeletePacket() instead of</code><br/> <code>void QUEUE::AddPacket()</code></li> <li>• 4 Marks to be awarded if Addition of Packet is done in place of Deletion according to the following distribution             <ul style="list-style-type: none"> <li>• ( 1 Mark for creating a new Packet)</li> <li>• ( ½ Mark for entering data for the new Packet)</li> <li>• ( ½ Mark for assigning NULL to link of the new Packet)</li> <li>• ( ½ Mark for assigning Front to the first Packet as Front = T)</li> </ul> </li> </ul> |  |

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|       |       | <ul style="list-style-type: none"> <li>( <i>½ Mark for linking the last Packet to the new Packet as Rear-&gt;LINK =T</i>)</li> <li>( <i>1 Mark for assigning Rear to the new Packet as Rear = T</i>)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
|-------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---------|---|--|---|---|---|---|---|---|----|---|---|-----|---|-----|-----|---|-----|------|---|------|------|---|------|-------|---|---|--------|---|-----|--------|---|-----|---------|---|---|-----------|---|--|-----------|--|
|       | (e)   | Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion:<br><br>$U * V + (W - Z) / X$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2     |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
|       | Ans   | $((U * V) + ((W - Z) / X))$ <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>INFIX</th> <th>STACK</th> <th>POSTFIX</th> </tr> </thead> <tbody> <tr><td>U</td><td></td><td>U</td></tr> <tr><td>*</td><td>*</td><td>U</td></tr> <tr><td>V</td><td>*</td><td>UV</td></tr> <tr><td>)</td><td></td><td>UV*</td></tr> <tr><td>+</td><td>+</td><td>UV*</td></tr> <tr><td>W</td><td></td><td>UV*w</td></tr> <tr><td>-</td><td>+ -</td><td>UV*w</td></tr> <tr><td>Z</td><td>+ -</td><td>UV*wz</td></tr> <tr><td>)</td><td>+</td><td>UV*wz-</td></tr> <tr><td>/</td><td>+ /</td><td>UV*wz-</td></tr> <tr><td>X</td><td>+ /</td><td>UV*wz-x</td></tr> <tr><td>)</td><td>+</td><td>UV*wz-x/</td></tr> <tr><td>)</td><td></td><td>UV*wz-x/+</td></tr> </tbody> </table> | INFIX | STACK | POSTFIX | U |  | U | * | * | U | V | * | UV | ) |   | UV* | + | +   | UV* | W |     | UV*w | - | + -  | UV*w | Z | + -  | UV*wz | ) | + | UV*wz- | / | + / | UV*wz- | X | + / | UV*wz-x | ) | + | UV*wz-x/  | ) |  | UV*wz-x/+ |  |
| INFIX | STACK | POSTFIX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| U     |       | U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| *     | *     | U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| V     | *     | UV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| )     |       | UV*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| +     | +     | UV*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| W     |       | UV*w                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| -     | + -   | UV*w                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| Z     | + -   | UV*wz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| )     | +     | UV*wz-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| /     | + /   | UV*wz-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| X     | + /   | UV*wz-x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| )     | +     | UV*wz-x/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| )     |       | UV*wz-x/+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
|       |       | OR<br><br>$U * V + (W - Z) / X$ <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>INFIX</th> <th>STACK</th> <th>POSTFIX</th> </tr> </thead> <tbody> <tr><td>U</td><td></td><td>U</td></tr> <tr><td>*</td><td>*</td><td>U</td></tr> <tr><td>V</td><td>*</td><td>UV</td></tr> <tr><td>+</td><td>+</td><td>UV*</td></tr> <tr><td>(</td><td>+ (</td><td>UV*</td></tr> <tr><td>W</td><td>+ (</td><td>UV*w</td></tr> <tr><td>-</td><td>+ (-</td><td>UV*w</td></tr> <tr><td>Z</td><td>+ (-</td><td>UV*wz</td></tr> <tr><td>)</td><td>+</td><td>UV*wz-</td></tr> <tr><td>/</td><td>+ /</td><td>UV*wz-</td></tr> <tr><td>X</td><td>+ /</td><td>UV*wz-x</td></tr> <tr><td></td><td></td><td>UV*wz-x/+</td></tr> </tbody> </table>                                     | INFIX | STACK | POSTFIX | U |  | U | * | * | U | V | * | UV | + | + | UV* | ( | + ( | UV* | W | + ( | UV*w | - | + (- | UV*w | Z | + (- | UV*wz | ) | + | UV*wz- | / | + / | UV*wz- | X | + / | UV*wz-x |   |   | UV*wz-x/+ |   |  |           |  |
| INFIX | STACK | POSTFIX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| U     |       | U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| *     | *     | U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| V     | *     | UV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| +     | +     | UV*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| (     | + (   | UV*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| W     | + (   | UV*w                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| -     | + (-  | UV*w                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| Z     | + (-  | UV*wz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| )     | +     | UV*wz-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| /     | + /   | UV*wz-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
| X     | + /   | UV*wz-x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
|       |       | UV*wz-x/+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |
|       |       | ( <i>½ Mark for conversion upto each operator illustrating through stack</i> )<br>OR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |       |         |   |  |   |   |   |   |   |   |    |   |   |     |   |     |     |   |     |      |   |      |      |   |      |       |   |   |        |   |     |        |   |     |         |   |   |           |   |  |           |  |

|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                |
|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|    |     | <b>(1 Mark for only the final answer as UV*WZ-X/+ )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                |
| 4. | (a) | <p>A text file named <b>MATTER.TXT</b> contains some text, which needs to be displayed such that every next character is separated by a symbol '#'.<br/><br/>         Write a function definition for <b>HashDisplay()</b> in C++ that would display the entire content of the file <b>MATTER.TXT</b> in the desired format.<br/><br/>         Example:<br/>         If the file MATTER.TXT has the following content stored in it:<br/><br/> <b>THE WORLD IS ROUND</b><br/><br/>         The function <b>HashDisplay()</b> should display the following content:<br/> <b>T#H#E# #W#O#R#L#D# #I#S# #R#O#U#N#D#</b></p>                                                   | 3                                                                                                                              |
|    | Ans | <pre>void HashDisplay() {     char ch;     ifstream F("MATTER.TXT" );     while(F.get(ch))         cout&lt;&lt;ch&lt;&lt;"#";     F.close(); //IGNORE }</pre> <p>OR<br/>         Any other correct function definition</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <pre>ifstream F; F.open("MATTER.TXT"); OR fstream F; F.open("MATTER.TXT", ios::in); OR fstream F("MATTER.TXT", ios::in);</pre> |
|    |     | <i>(1 Mark for opening MATTER.TXT correctly)<br/> (1 Mark for reading each character (using any method) from the file)<br/> (½ Mark for displaying the character)<br/> (½ Mark for displaying a # following the character)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                |
|    | (b) | <p>Write a definition for function <b>TotalTeachers( )</b> in C++ to read each object of a binary file <b>SCHOOLS.DAT</b>, find the total number of teachers, whose data is stored in the file and display the same. Assume that the file <b>SCHOOLS.DAT</b> is created with the help of objects of class <b>SCHOOLS</b>, which is defined below:</p> <pre>class SCHOOLS {     int SCode;           // School Code     char SName[20];     // School Name     int NOT;            // Number of Teachers in the school public:     void Display()     {cout&lt;&lt;SCode&lt;&lt;"#"&lt;&lt;SName&lt;&lt;"#"&lt;&lt;NOT&lt;&lt;endl;}     int RNOT(){return NOT;} };</pre> | 2                                                                                                                              |
|    | Ans | <pre>void TotalTeachers() {     ifstream F;     F.open("SCHOOLS.DAT",ios::binary);</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <pre>OR fstream F;</pre>                                                                                                       |

```

int Count=0;
SCHOOLS S;

while(F.read((char*)&S,sizeof(S)))
    Count += S.RNOT();

cout<<"Total number of teachers :"<<Count<<endl;
F.close(); //IGNORE
}

OR

void TotalTeachers()
{
    ifstream F;
    F.open("SCHOOLS.DAT",ios::binary);
    SCHOOLS S;
    while(F.read((char*)&S,sizeof(S)))
        cout<<S.RNOT()<<endl;//OR S.Display();
    F.close(); //IGNORE
}
OR

Any other correct function definition

```

↓

```

OR
fstream F;
F.open("SCHOOLS.DAT",ios::binary|ios::in);

```

*(½ Mark for opening SCHOOLS.DAT correctly)  
 (½ Mark for reading each record from the file)*

*(½ Mark for finding Total number of teachers)  
 (½ Mark for displaying Total number of teachers)*

*OR*

*(1 mark for displaying number of teachers in Each Record)*

- (c)** Find the output of the following C++ code considering that the binary file SCHOOLS.DAT exists on the hard disk with the following records of 10 schools of the class SCHOOLS as declared in the previous question (4 b). 1

| SCode | SName                    | NOT |
|-------|--------------------------|-----|
| 1001  | Brains School            | 100 |
| 1003  | Child Life School        | 115 |
| 1002  | Care Share School        | 300 |
| 1006  | Educate for Life School  | 50  |
| 1005  | Guru Shishya Sadan       | 195 |
| 1004  | Holy Education School    | 140 |
| 1010  | Rahmat E Talim School    | 95  |
| 1008  | Innovate Excel School    | 300 |
| 1011  | Premier Education School | 200 |
| 1012  | Uplifted Minds School    | 100 |

```

void main()
{

```

|                                                                |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|----------------------------------------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                                                                |     | <pre> fstream SFIN; SFIN.open("SCHOOLS.DAT",ios::binary ios::in); SCHOOLS S; SFIN.seekg(5*sizeof(S)); SFIN.read((char*)&amp;S, sizeof(S)); S.Display(); cout&lt;&lt;"Record :"&lt;&lt;SFIN.tellg()/sizeof(S) + 1&lt;&lt;endl; SFIN.close(); } </pre>                                                                                                                                                                                                                                                   |   |
|                                                                | Ans | <b>1004#Holy Education School#140</b><br><b>Record :7</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
|                                                                |     | <i>(½ Mark for displaying correct values of Record 6 )</i><br><i>(½ Mark for displaying correct value of SFIN.tellg()/sizeof(B) + 1)</i>                                                                                                                                                                                                                                                                                                                                                               |   |
| <b>SECTION B - [Only for candidates, who opted for Python]</b> |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
| 1                                                              | (a) | Differentiate between Syntax Error and Run-Time Error? Also, write a suitable example in Python to illustrate both.                                                                                                                                                                                                                                                                                                                                                                                    | 2 |
|                                                                | Ans | <p><b>Syntax error:</b> An error of language resulting from code that does not conform to the syntax of the programming language.</p> <p>Example</p> <pre> a = 0 while a &lt; 10 # : is missing as per syntax     a = a + 1     print a </pre> <p><b>Runtime error:</b> A runtime error is an error that causes abnormal termination of program during running time..</p> <p>Example</p> <pre> A=10 B=int(raw_input("Value:")) print A/B # If B entered by user is 0, it will be run-time error </pre> |   |
|                                                                |     | <i>( ½ mark each for defining syntax error and run-time error )</i><br><i>( ½ mark for each correct example)</i><br><b>OR</b><br><i>( Full 2 Marks for illustrating both through examples)</i>                                                                                                                                                                                                                                                                                                         |   |
|                                                                | (b) | Name the Python Library modules which need to be imported to invoke the following functions:                                                                                                                                                                                                                                                                                                                                                                                                           | 1 |
|                                                                |     | (i) <b>sin()</b> (ii) <b>search()</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|                                                                | Ans | (i) <b>math</b> (ii) <b>re</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|                                                                |     | <i>(½ Mark for writing each correct Library module)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|                                                                |     | <b>Note:</b> Ignore any other Library modules, if mentioned.                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |

**CBSE AISSCE 2017-2018 Marking Scheme for Computer Science**  
 (2018-2019 Sub Code: 083 Paper Code: 91)

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | (c) Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 |
|     | <pre> Val = int(rawinput("Value:")) Adder = 0  for C in range(1,Val,3)     Adder+=C     if C%2=0:         Print C*10     Else:         print C* print Adder </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
| Ans | <pre> Val = int(raw_input("Value:")) # Error 1 Adder = 0  for C in range(1,Val,3): # Error 2     Adder+=C     if C%2==0: # Error 3         print C*10 # Error 4     else: # Error 5         print C # Error 6 print Adder </pre> <p><b>OR</b></p> <p>Corrections mentioned as follows:</p> <ul style="list-style-type: none"> <li><u>raw_input</u> in place of <u>rawinput</u></li> <li>: to be placed in <u>for</u></li> <li><u>==</u> in place of <u>=</u></li> <li><u>print</u> in place of <u>Print</u></li> <li><u>else</u> in place of <u>Else</u></li> <li><u>C*</u> is invalid, replaced by a suitable integer or C</li> </ul> |   |
|     | <p><i>(1/2 Mark for each correction, not exceeding 2 Marks)</i></p> <p><b>OR</b></p> <p><i>(1 mark for identifying the errors, without suggesting corrections)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| (d) | Find and write the output of the following python code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 |
|     | <pre> Data = ["P",20,"R",10,"S",30] Times = 0 Alpha = "" Add = 0 for C in range(1,6,2):     Times= Times + C </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |

**CBSE AISSCE 2017-2018 Marking Scheme for Computer Science**  
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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
|--|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <pre> Alpha= Alpha + Data[C-1]+"\$" Add = Add + Data[C] print Times,Add,Alpha </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|  | Ans | <pre> 1 20 P\$ 4 30 P\$R\$ 9 60 P\$R\$\$S </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|  |     | <i>( 1 Mark for each correct line of output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|  |     | <b>Note:</b> <ul style="list-style-type: none"> <li>● <i>½ Mark deduction for not considering all line changes</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |   |
|  | (e) | Find and write the output of the following python code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3 |
|  |     | <pre> class GRAPH:     def __init__(self,A=50,B=100):         self.P1=A         self.P2=B     def Up(self,B):         self.P2 = self.P2 - B     def Down(self,B):         self.P2 = self.P2 + 2*B     def Left(self,A):         self.P1 = self.P1 - A     def Right(self,A):         self.P1 = self.P1 + 2*A     def Target(self):         print "(",self.P1.":" ,self.P2,")" G1=GRAPH(200,150) G2=GRAPH() G3=GRAPH(100) G1.Left(10) G2.Up(25) G3.Down(75) G1.Up(30) G3.Right(15) G1.Target() G2.Target() G3.Target() </pre> |   |
|  | Ans | <pre> ( 190 : 120 ) ( 50 : 75 ) ( 130 : 250 ) </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|  |     | <i>( 1 mark for each correct line of output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|  |     | <i>OR</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|  |     | <i>( Full 3 marks to be awarded if "Error" / "No Output" in<br/> <i>print "(",self.P1.":" ,self.P2,")"</i> is mentioned)</i>                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|  |     | <b>Note:</b> <ul style="list-style-type: none"> <li>● <i>Deduct ½ Mark for not writing any or all ':' / '(' / ')' symbol(s)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   |   |

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|                 |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                |                 |                |  |
|-----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|-----------------|----------------|--|
|                 |                | <ul style="list-style-type: none"> <li>● <i>Deduct ½ Mark for not considering any or all line breaks at proper place(s)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |               |                |                 |                |  |
|                 | (f)            | <p>What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables BEGIN and LAST.</p> <pre>import random POINTS=[20,40,10,30,15]; POINTS=[30,50,20,40,45];  BEGIN=random.randint(1,3) LAST=random.randint(2,4) for C in range(BEGIN,LAST+1):     print POINTS[C],"#",</pre>                                                                                           | 2             |                |                 |                |  |
|                 |                | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">(i) 20#50#30#</td> <td style="padding: 5px;">(ii) 20#40#45#</td> </tr> <tr> <td style="padding: 5px;">(iii) 50#20#40#</td> <td style="padding: 5px;">(iv) 30#50#20#</td> </tr> </table>                                                                                                                                                                                                                             | (i) 20#50#30# | (ii) 20#40#45# | (iii) 50#20#40# | (iv) 30#50#20# |  |
| (i) 20#50#30#   | (ii) 20#40#45# |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                |                 |                |  |
| (iii) 50#20#40# | (iv) 30#50#20# |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                |                 |                |  |
|                 | Ans            | (ii) 20#40#45# and (iii) 50#20#40#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                |                 |                |  |
|                 |                | <p>Max value for BEGIN 3<br/>         Max value for LAST 4</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                 |                |  |
|                 |                | <p><i>(1 Mark for writing the correct options)</i><br/> <i>OR</i><br/> <i>(½ Mark for writing only option (ii))</i><br/> <i>OR</i><br/> <i>(½ Mark for writing only option (iii))</i><br/> <i>OR</i><br/> <i>(Full 2 Marks to be awarded if “ERROR”/ “NO OUTPUT” mentioned)</i></p> <p><i>NOTE: No marks to be awarded for writing any other option or any other combination</i></p> <p><i>(½ Mark for writing correct Maximum value of BEGIN)</i><br/> <i>(½ Mark for writing correct Maximum value of LAST)</i></p> |               |                |                 |                |  |
| 2               | (a)            | What is the advantage of super() function in inheritance? Illustrate the same with the help of an example in Python.                                                                                                                                                                                                                                                                                                                                                                                                  | 2             |                |                 |                |  |
|                 | Ans            | <p>In Python, super() function is used to call the methods of base class which have been extended in derived class.</p> <pre>class person(object):     def __init__(self,name,age):         self.name=name         self.age=age     def display(self):</pre>                                                                                                                                                                                                                                                          |               |                |                 |                |  |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|      | <pre>         print self.name, self.Age class student(person):     def __init__(self,name,age,rollno,marks):         super(student,self).__init__(self, name, age)         self.rollno=rollno         self.marks=marks     def getRoll(self):         print self.rollno, self.marks </pre>                                                                                                                                                                                                                                                                                                                            |   |
|      | <i>(1 mark for mentioning the advantage, 1 mark for writing any suitable example)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| (b)  | <pre> class Vehicle:                                #Line 1     Type = 'Car'                               #Line 2     def __init__(self, name):                  #Line 3         self.Name = name                      #Line 4     def Show(self):                           #Line 5         print self.Name,Vehicle.Type #Line 6  V1=Vehicle("BMW")                            #Line 7 V1.Show()                                    #Line 8 Vehicle.Type="Bus"                           #Line 9 V2=Vehicle("VOLVO")                          #Line 10 V2.Show()                                    #Line 11 </pre> | 2 |
| (i)  | What is the difference between the variable in Line 2 and Line 4 in the above Python code?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| Ans  | <p>The variable in Line 2 is a class attribute. This belongs to the class itself. These attributes will be shared by all the instances.</p> <p>The variable in Line 4 is an instance attribute. Each instance creates a separate copy of these variables.</p>                                                                                                                                                                                                                                                                                                                                                         |   |
|      | <i>(1 mark for correct difference)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| (ii) | Write the output of the above Python code.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| Ans  | BMW Car<br>VOLVO Bus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|      | <i>(½ for writing each correct line of output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
| (c)  | Define a class CONTAINER in Python with following specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4 |
|      | <b>Instance Attributes</b> <ul style="list-style-type: none"> <li>- Radius,Height # Radius and Height of Container</li> <li>- Type          # Type of Container</li> <li>- Volume        # Volume of Container</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |   |

|      | <p><b>Methods</b></p> <ul style="list-style-type: none"> <li>- <code>CalVolume()</code>      # To calculate volume<br/># as per the Type of container<br/># With the formula as given below:</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Type</th><th style="padding: 5px;">Formula to calculate Volume</th></tr> </thead> <tbody> <tr> <td style="padding: 5px;">1</td><td style="padding: 5px;"><code>3.14 * Radius * Height</code></td></tr> <tr> <td style="padding: 5px;">3</td><td style="padding: 5px;"><code>3.14 * Radius * Height/3</code></td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>- <code>GetValue()</code>      # To allow user to enter values of<br/># Radius, Height and Type.<br/># Also, this method should call<br/># <code>CalVolume()</code> to calculate Volume</li> <li>- <code>ShowContainer()</code> # To display Radius, Height, Type<br/># Volume of the Container</li> </ul> | Type | Formula to calculate Volume | 1 | <code>3.14 * Radius * Height</code> | 3 | <code>3.14 * Radius * Height/3</code> |  |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------|---|-------------------------------------|---|---------------------------------------|--|
| Type | Formula to calculate Volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                             |   |                                     |   |                                       |  |
| 1    | <code>3.14 * Radius * Height</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                             |   |                                     |   |                                       |  |
| 3    | <code>3.14 * Radius * Height/3</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                             |   |                                     |   |                                       |  |
| Ans  | <pre>class CONTAINER: # class CONTAINER():/class CONTAINER(Object):     def __init__(self):           # def __init__(self,R,H,T,V):         self.Radius=0             #     self.Radius=R         self.Height=0              #     self.Height=H         self.Type =0                #     self.Type=T         self.Volume=0               #     self.Volume=V      def CalVolume(self):         if self.Type == 1:             self.Volume = 3.14 * self.Radius * self.Height         elif self.Type ==3:             self.Volume = 3.14 * self.Radius * self.Height /3     def GetValue(self):         self.Radius = input("Enter Radius")         self.Height = input("Enter Height")         self.Type = input("Enter type")         self.CalVolume()           # OR      CalVolume(self)     def ShowContainer(self):         print self.Radius         print self.Height         print self.Type         print self.Volume</pre>                                                                      |      |                             |   |                                     |   |                                       |  |
|      | <p>(½ Mark for correct syntax for class header)<br/>     (½ Mark for correct declaration of instance attributes)<br/>     (1 Mark for correct definition of <code>CalVolume()</code> function)<br/>     (1 Mark for correct definition of <code>GetValue()</code> with proper invocation of <code>CalVolume()</code>)<br/>     (1 Mark for correct definition of <code>ShowContainer()</code>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                             |   |                                     |   |                                       |  |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|            | <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Deduct <math>\frac{1}{2}</math> Mark if <i>CalVolume()</i> is not invoked properly inside <i>NewBox()</i> function</li> <li>• Marks not to be deducted for replacing the Formulae for calculating the Volumes with correct Formulae</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
| (d)        | <p>Answer the questions (i) to (iv) based on the following:</p> <pre> <b>Class Top1(object):</b>     def __init__(self,tx):           #Line 1         self.X=tx                   #Line 2     def ChangeX(self,tx):         self.X=self.X+tx     def ShowX(self):         print self.X  <b>Class Top2(object):</b>     def __init__(self,ty):           #Line 3         self.Y=ty                   #Line 4     def ChangeY(self,ty):         self.Y=self.Y+ty     def ShowY(self):         print self.Y,  <b>class Bottom(Top1,Top2):</b>     def __init__(self,tz):           #Line 5         self.Z = tz                  #Line 6         Top2.__init__(self,2*tz)      #Line 7         Top1.__init__(self,3*tz)      #Line 8     def ChangeZ(self,tz):         self.Z=self.Z+tz         self.ChangeY(2*tz)         self.ChangeX(3*tz)     def ShowZ(self):         print self.Z,         self.ShowY()         self.ShowX()  B=Bottom(1) B.ChangeZ(2) B.ShowZ() </pre> | 4 |
| (i)        | Write the type of the inheritance illustrated in the above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
| <b>Ans</b> | Multiple Inheritance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |

**CBSE AISSCE 2017-2018 Marking Scheme for Computer Science**  
 (2018-2019 Sub Code: 083 Paper Code: 91)

|   |       |                                                                                                                                                                                                                                                                                                                                                          |   |
|---|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   |       | <b>(1 Mark for writing correct Inheritance type)</b>                                                                                                                                                                                                                                                                                                     |   |
|   | (ii)  | Find and write the output of the above code.                                                                                                                                                                                                                                                                                                             |   |
|   | Ans   | 3 6 9<br>OR<br>“Error” / “No Output”                                                                                                                                                                                                                                                                                                                     |   |
|   |       | <b>(1 Mark for writing correct answer)</b>                                                                                                                                                                                                                                                                                                               |   |
|   | (iii) | What are the methods shown in Line 1, Line 3 and Line 5 are known as?                                                                                                                                                                                                                                                                                    |   |
|   | Ans   | Constructors                                                                                                                                                                                                                                                                                                                                             |   |
|   |       | <b>(1 Mark for writing correct answer)</b>                                                                                                                                                                                                                                                                                                               |   |
|   | (iv)  | What is the difference between the statements shown in Line 6 and Line 7?                                                                                                                                                                                                                                                                                |   |
|   | Ans   | Initializing the member of child class in Line 6 and calling the parent class constructor in Line 7                                                                                                                                                                                                                                                      |   |
|   |       | <b>(1 Mark for writing correct answer)</b>                                                                                                                                                                                                                                                                                                               |   |
| 3 | (a)   | Consider the following randomly ordered numbers stored in a list<br>786, 234, 526, 132, 345, 467,<br><br>Show the content of list after the First, Second and Third pass of the bubble sort method used for arranging in <b>ascending order</b> ?<br><br>Note: Show the status of all the elements after each pass very clearly underlining the changes. | 3 |
|   | Ans   | I Pass    234, <u>526</u> , <u>132</u> , <u>345</u> , <u>467</u> ,  786<br>II Pass    234, <u>132</u> , <u>345</u> , <u>467</u> , <u>526</u> ,  786<br>III Pass <u>132</u> , <u>234</u> , <u>345</u> ,  467,  526,  786                                                                                                                                  |   |
|   |       | <b>(1 mark for each correct pass)</b>                                                                                                                                                                                                                                                                                                                    |   |
|   | (b)   | Write definition of a method <b>ZeroEnding(SCORES)</b> to add all those values in the list of SCORES, which are ending with zero (0) and display the sum.<br><br>For example,<br>If the SCORES contain [200,456,300,100,234,678]<br><br>The sum should be displayed as 600                                                                               | 3 |
|   | Ans   | <b>def ZeroEnding(SCORES) :</b><br>s=0<br><b>for i in SCORES:</b><br><b>if i%10==0:</b><br>s=s+i<br><b>print s</b>                                                                                                                                                                                                                                       |   |
|   |       | <b>( ½ mark for function header)</b><br><b>( ½ mark for initializing s (sum) with 0 )</b>                                                                                                                                                                                                                                                                |   |

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 (2018-2019 Sub Code: 083 Paper Code: 91)

|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|--|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | ( <i>½ mark for reading each element of the list using a loop</i> )<br>( <i>½ mark for checking whether the value is ending with 0</i> )<br>( <i>½ mark for adding it to the sum</i> )<br>( <i>½ mark for printing or returning the value</i> )                                                                                                                                                                                                                                                                                                                                     |   |
|  | (c) | Write AddClient(Client) and DeleteCleint(Client) methods in python to add a new Client and delete a Client from a List of Client Names, considering them to act as insert and delete operations of the queue data structure.                                                                                                                                                                                                                                                                                                                                                        | 4 |
|  | Ans | <pre> def AddClient(Client):     C=raw_input("Client name: ")     Client.append(C)  def DeleteClient(Client):     if (Client==[]):         print "Queue empty"     else:         print Client[0],"Deleted"         del Client[0]          # OR Client.pop(0) OR class queue:     Client=[]     def AddClient(self):         a=raw_input("Client name: ")         queue.Client.append(a)     def DeleteClient(self):         if (queue.Client==[]):             print "Queue empty"         else:             print queue.Client[0],"Deleted"             del queue.Client[0] </pre> |   |
|  |     | ( <i>½ mark insert header</i> )<br>( <i>½ mark for accepting a value from user</i> )<br>( <i>½ mark for adding value in list</i> )<br>( <i>½ mark for delete header</i> )<br>( <i>½ mark for checking empty list condition</i> )<br>( <i>½ mark for displaying “Queue empty”</i> )<br>( <i>½ mark for displaying the value to be deleted</i> )<br>( <i>½ mark for deleting value from list</i> )                                                                                                                                                                                    |   |
|  | (d) | Write definition of a Method COUNTNOW(PLACES) to find and display those place names, in which there are more than 5 characters.<br><br>For example:                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2 |
|  |     | If the list PLACES contains<br><pre>[ "DELHI" , "LONDON" , "PARIS" , "NEW YORK" , "DUBAI" ]</pre> The following should get displayed<br><b>LONDON</b><br><b>NEW YORK</b>                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|  | Ans | <b>def COUNTNOW(PLACES) :</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |

|          |                | <pre>for P in PLACES:     if len(P)&gt;5:         print P</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|----------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------|----|----|----|--------|---|---|---|------|----|----------|---|-------|---|----|----|--------|---|----|--|
|          |                | <i>(1 Mark for correct loop)</i><br><i>(½ Mark for checking length of place name)</i><br><i>(½ Mark for display desired place names)</i>                                                                                                                                                                                                                                                                                                                                                        |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          | <b>(e)</b>     | Evaluate the following Postfix notation of expression:                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2       |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          |                | <b>22,11,/ ,5,10,* ,+,12,-</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          | <b>Ans</b>     | <table border="1"> <thead> <tr> <th>Element</th><th>Stack Contents</th></tr> </thead> <tbody> <tr><td>22</td><td>22</td></tr> <tr><td>11</td><td>22, 11</td></tr> <tr><td>/</td><td>2</td></tr> <tr><td>5</td><td>2, 5</td></tr> <tr><td>10</td><td>2, 5, 10</td></tr> <tr><td>*</td><td>2, 50</td></tr> <tr><td>+</td><td>52</td></tr> <tr><td>12</td><td>52, 12</td></tr> <tr><td>-</td><td>40</td></tr> </tbody> </table>                                                                    | Element | Stack Contents | 22 | 22 | 11 | 22, 11 | / | 2 | 5 | 2, 5 | 10 | 2, 5, 10 | * | 2, 50 | + | 52 | 12 | 52, 12 | - | 40 |  |
| Element  | Stack Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| 22       | 22             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| 11       | 22, 11         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| /        | 2              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| 5        | 2, 5           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| 10       | 2, 5, 10       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| *        | 2, 50          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| +        | 52             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| 12       | 52, 12         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| -        | 40             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          |                | <b>OR</b><br><b>Any other way of stepwise evaluation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          |                | <i>(½ Mark for evaluation till each operator)</i><br><b>OR</b><br><i>(1 Mark for only writing the correct answer without showing stack status)</i>                                                                                                                                                                                                                                                                                                                                              |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
| <b>4</b> | <b>(a)</b>     | Write a statement in Python to open a text file STORY.TXT so that new contents can be added at the end of it.                                                                                                                                                                                                                                                                                                                                                                                   | 1       |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          | <b>Ans</b>     | <b>file= open("STORY.TXT", "a") OR file.open("STORY.TXT", "a")</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          |                | <i>(1 mark for correct statement)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |
|          | <b>(b)</b>     | Write a method in python to read lines from a text file INDIA.TXT, to find and display the occurrence of the word “India”.<br>For example:<br>If the content of the file is<br><hr/> <i>“India is the fastest growing economy.</i><br><i>India is looking for more investments around the globe.</i><br><i>The whole world is looking at India as a great market.</i><br><i>Most of the Indians can foresee the heights that India is capable of reaching.”</i><br><hr/> The output should be 4 | 2       |                |    |    |    |        |   |   |   |      |    |          |   |       |   |    |    |        |   |    |  |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| Ans | <pre> def display1():     c=0     file=open('INDIA.TXT', 'r')     c=0     for LINE in file:         Words = LINE.split()         for W in Words:             if W=="India":                 c=c+1     print c     file.close()  OR  def display():     c=0     file=open('INDIA.TXT', 'r')      lines = file.read() # lines = file.readline()     while lines:         words = lines.split()         for w in words:             if w=="India":                 c=c+1         lines = file.read() # lines = file.readline()     print c     file.close() </pre> |   |
|     | <i>(½ Mark for opening the file)</i><br><i>(½ Mark for reading all lines, and dividing it into words)</i><br><i>(½ Mark for checking condition and incrementing count)</i><br><i>(½ Mark for displaying count)</i>                                                                                                                                                                                                                                                                                                                                              |   |
|     | <i>Note: Ignore if try: except:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
| (c) | Considering the following definition of class MULTIPLEX, write a method in python to search and display all the content in a pickled file CINEMA.DAT, where MTYPE is matching with the value 'Comedy'. <pre> class MULTIPLEX:     def __init__(self,mno,mname,mtype):         self.MNO      = mno         self.MNAME    = mname         self.MTYPE    = mtype     def Show(self):         print self.MNO:"*",self.MNAME,"\$",self.MTYPE </pre>                                                                                                                  | 3 |
| Ans | <pre> def Search():     file=open('CINEMA.DAT', 'rb')     try:         while True:             M=pickle.load(file)             if M.MTYPE=="Comedy":                 M.Show()     except EOFError:         pass </pre>                                                                                                                                                                                                                                                                                                                                          |   |

|  |  |                                                                                                                                                                                                                                                                                  |  |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |  | <code>file.close()</code>                                                                                                                                                                                                                                                        |  |
|  |  | <i>(½ Mark for correct function header)</i><br><i>(½ Mark for opening the file CINEMA.DAT correctly)</i><br><i>(½ Mark for correct loop)</i><br><i>(½ Mark for correct load())</i><br><i>(½ Mark for correct checking of MTYPE)</i><br><i>(½ Mark for displaying the record)</i> |  |

### SECTION C - (For all the candidates)

|   |     |                                                                                                                                                                                                                                                                                                 |   |
|---|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 5 | (a) | Observe the following tables VIDEO and MEMBER carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown below, Also, find the Degree and Cardinality of the final result. | 2 |
|---|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

TABLE: VIDEO

| VNO  | VNAME             | TYPE      |
|------|-------------------|-----------|
| F101 | The Last Battle   | Fiction   |
| C101 | Angels and Devils | Comedy    |
| A102 | Daredevils        | Adventure |

TABLE: MEMBER

| MNO  | MNAME        |
|------|--------------|
| M101 | Namish Gupta |
| M102 | Sana Sheikh  |
| M103 | Lara James   |

FINAL RESULT

| VNO  | VNAME             | TYPE      | MNO  | MNAME        |
|------|-------------------|-----------|------|--------------|
| F101 | The Last Battle   | Fiction   | M101 | Namish Gupta |
| F101 | The Last Battle   | Fiction   | M102 | Sana Sheikh  |
| F101 | The Last Battle   | Fiction   | M103 | Lara James   |
| C101 | Angels and Devils | Comedy    | M101 | Namish Gupta |
| C101 | Angels and Devils | Comedy    | M102 | Sana Sheikh  |
| C101 | Angels and Devils | Comedy    | M103 | Lara James   |
| A102 | Daredevils        | Adventure | M101 | Namish Gupta |
| A102 | Daredevils        | Adventure | M102 | Sana Sheikh  |
| A102 | Daredevils        | Adventure | M103 | Lara James   |

|     |                   |  |
|-----|-------------------|--|
| Ans | CARTESIAN PRODUCT |  |
|-----|-------------------|--|

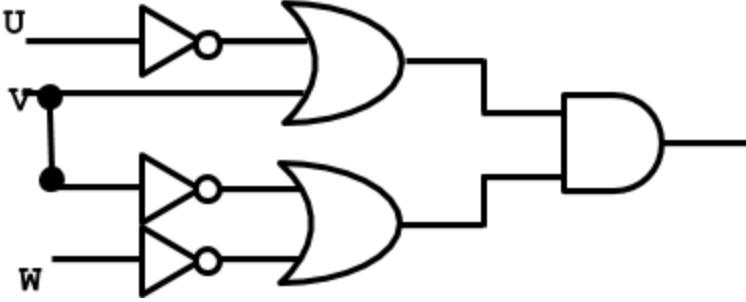
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>OR Option (iv)</b><br><br><b>DEGREE = 5</b><br><b>CARDINALITY = 9</b>                                                                                                                                                    |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-------|---------|------|-------------|-----------|-----|-------------|----------|------------|----------|-----------|------|--------------|------------|------|-------------|------------|----------|------------|------|-----|------|---------|------------|------|-----|-------|---------|------------|
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>(1 Mark for writing CARTESIAN PRODUCT OR Option (iv))</b><br><b>(½ Mark for writing correct Degree)</b><br><b>(½ Mark for writing correct Cardinality)</b>                                                               |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>(b)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables.                                                                                                            | 6        |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>Table: ACCOUNT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                             |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <table border="1"> <thead> <tr> <th>ANO</th> <th>ANAME</th> <th>ADDRESS</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>Nirja Singh</td> <td>Bangalore</td> </tr> <tr> <td>102</td> <td>Rohan Gupta</td> <td>Chennai</td> </tr> <tr> <td>103</td> <td>Ali Reza</td> <td>Hyderabad</td> </tr> <tr> <td>104</td> <td>Rishabh Jain</td> <td>Chennai</td> </tr> <tr> <td>105</td> <td>Simran Kaur</td> <td>Chandigarh</td> </tr> </tbody> </table>                                                                                                                                                               |                                                                                                                                                                                                                             |          | ANO        | ANAME | ADDRESS | 101  | Nirja Singh | Bangalore | 102 | Rohan Gupta | Chennai  | 103        | Ali Reza | Hyderabad | 104  | Rishabh Jain | Chennai    | 105  | Simran Kaur | Chandigarh |          |            |      |     |      |         |            |      |     |       |         |            |
| ANO  | ANAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ADDRESS                                                                                                                                                                                                                     |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| 101  | Nirja Singh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Bangalore                                                                                                                                                                                                                   |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| 102  | Rohan Gupta                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Chennai                                                                                                                                                                                                                     |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| 103  | Ali Reza                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hyderabad                                                                                                                                                                                                                   |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| 104  | Rishabh Jain                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Chennai                                                                                                                                                                                                                     |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| 105  | Simran Kaur                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Chandigarh                                                                                                                                                                                                                  |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>Table: TRANSACT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                             |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <table border="1"> <thead> <tr> <th>TRNO</th> <th>ANO</th> <th>AMOUNT</th> <th>TYPE</th> <th>DOT</th> </tr> </thead> <tbody> <tr> <td>T001</td> <td>101</td> <td>2500</td> <td>Withdraw</td> <td>2017-12-21</td> </tr> <tr> <td>T002</td> <td>103</td> <td>3000</td> <td>Deposit</td> <td>2017-06-01</td> </tr> <tr> <td>T003</td> <td>102</td> <td>2000</td> <td>Withdraw</td> <td>2017-05-12</td> </tr> <tr> <td>T004</td> <td>103</td> <td>1000</td> <td>Deposit</td> <td>2017-10-22</td> </tr> <tr> <td>T005</td> <td>101</td> <td>12000</td> <td>Deposit</td> <td>2017-11-06</td> </tr> </tbody> </table> |                                                                                                                                                                                                                             |          | TRNO       | ANO   | AMOUNT  | TYPE | DOT         | T001      | 101 | 2500        | Withdraw | 2017-12-21 | T002     | 103       | 3000 | Deposit      | 2017-06-01 | T003 | 102         | 2000       | Withdraw | 2017-05-12 | T004 | 103 | 1000 | Deposit | 2017-10-22 | T005 | 101 | 12000 | Deposit | 2017-11-06 |
| TRNO | ANO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | AMOUNT                                                                                                                                                                                                                      | TYPE     | DOT        |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| T001 | 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2500                                                                                                                                                                                                                        | Withdraw | 2017-12-21 |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| T002 | 103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3000                                                                                                                                                                                                                        | Deposit  | 2017-06-01 |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| T003 | 102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2000                                                                                                                                                                                                                        | Withdraw | 2017-05-12 |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| T004 | 103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1000                                                                                                                                                                                                                        | Deposit  | 2017-10-22 |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
| T005 | 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12000                                                                                                                                                                                                                       | Deposit  | 2017-11-06 |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>(i)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | To display details of all transactions of TYPE Deposit from Table TRANSACT.                                                                                                                                                 |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>Ans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>SELECT * FROM TRANSACT WHERE TYPE = 'Deposit';</b>                                                                                                                                                                       |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>(½ Mark for correct SELECT statement)</b><br><b>(½ Mark for correct WHERE clause)</b>                                                                                                                                    |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>(ii)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | To display the ANO and AMOUNT of all Deposits and Withdrawals done in the month of October 2017 from table TRANSACT.                                                                                                        |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      | <b>Ans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>SELECT ANO,AMOUNT FROM TRANSACT</b><br><b>WHERE DOT &gt;= '2017-10-01' AND DOT &lt;= '2017-10-31';</b><br><b>OR</b><br><b>SELECT ANO,AMOUNT FROM TRANSACT</b><br><b>WHERE DOT BETWEEN '2017-10-01' AND '2017-10-31';</b> |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>(½ Mark for correct SELECT statement)</b>                                                                                                                                                                                |          |            |       |         |      |             |           |     |             |          |            |          |           |      |              |            |      |             |            |          |            |      |     |      |         |            |      |     |       |         |            |

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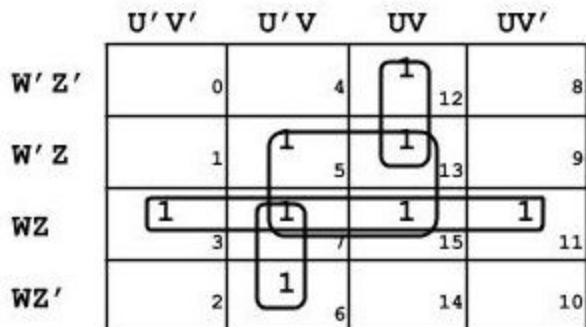
|                   |                     | <p><i>(½ Mark for correct WHERE clause)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• No marks to be deducted if MONTH() is used.</li> <li>• No marks to be deducted if LIKE clause is used correctly.</li> </ul>                                                                                                                                                                                                                                                                                                                                           |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|-------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|-----|----------|-----|-------------|-------------------|---------------------|-----|-------------|-----|-------------|-----|----------|-----|--------------|-----|-------------|--|
|                   | (iii)               | To display the last date of transaction (DOT) from the table TRANSACT for the Accounts having ANO as 103.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | Ans                 | <b>SELECT MAX(DOT) FROM TRANSACT WHERE ANO = 103;</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   |                     | <p><i>(½ Mark for correct SELECT statement)</i></p> <p><i>(½ Mark for correct WHERE clause)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | (iv)                | To display all ANO, ANAME and DOT of those persons from tables ACCOUNT and TRANSACT who have done transactions less than or equal to 3000.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | Ans                 | <b>SELECT ACCOUNT.ANO,ANAME,DOT FROM ACCOUNT,TRANSACT WHERE ACCOUNT.ANO=TRANSACT.ANO AND AMOUNT &lt;=3000;</b><br><b>OR</b><br><b>SELECT A.ANO,ANAME,DOT FROM ACCOUNT A,TRANSACT T WHERE A.ANO=T.ANO AND AMOUNT &lt;=3000;</b>                                                                                                                                                                                                                                                                                                                                                     |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   |                     | <p><i>(½ Mark for correct SELECT statement)</i></p> <p><i>(½ Mark for correct WHERE clause)</i></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• Marks not to be deducted for writing <b>SELECT ANO instead of SELECT ACCOUNT.ANO / SELECT A.ANO</b></li> </ul>                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | (v)                 | <b>SELECT ANO, ANAME FROM ACCOUNT<br/>WHERE ADDRESS NOT IN ('CHENNAI', 'BANGALORE');</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | Ans                 | <table> <thead> <tr> <th><b><u>ANO</u></b></th> <th><b><u>ANAME</u></b></th> </tr> </thead> <tbody> <tr> <td>103</td> <td>Ali Reza</td> </tr> <tr> <td>105</td> <td>Simran Kaur</td> </tr> </tbody> </table> <p><b>OR</b></p> <table> <thead> <tr> <th><b><u>ANO</u></b></th> <th><b><u>ANAME</u></b></th> </tr> </thead> <tbody> <tr> <td>101</td> <td>Nirja Singh</td> </tr> <tr> <td>102</td> <td>Rohan Gupta</td> </tr> <tr> <td>103</td> <td>Ali Reza</td> </tr> <tr> <td>104</td> <td>Rishabh Jain</td> </tr> <tr> <td>105</td> <td>Simran Kaur</td> </tr> </tbody> </table> | <b><u>ANO</u></b> | <b><u>ANAME</u></b> | 103 | Ali Reza | 105 | Simran Kaur | <b><u>ANO</u></b> | <b><u>ANAME</u></b> | 101 | Nirja Singh | 102 | Rohan Gupta | 103 | Ali Reza | 104 | Rishabh Jain | 105 | Simran Kaur |  |
| <b><u>ANO</u></b> | <b><u>ANAME</u></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 103               | Ali Reza            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 105               | Simran Kaur         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| <b><u>ANO</u></b> | <b><u>ANAME</u></b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 101               | Nirja Singh         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 102               | Rohan Gupta         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 103               | Ali Reza            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 104               | Rishabh Jain        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
| 105               | Simran Kaur         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   |                     | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | (vi)                | <b>SELECT DISTINCT ANO FROM TRANSACT;</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |
|                   | Ans                 | <u>DISTINCT ANO</u><br>101<br>102<br>103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                     |     |          |     |             |                   |                     |     |             |     |             |     |          |     |              |     |             |  |

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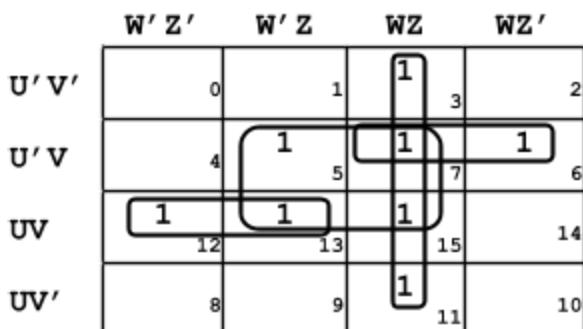
|                  |                     | <i>(½ Mark for correct output)<br/>NOTE: Values may be written in any order</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|---------------------|-----------------|----------------|-------|-----|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
|                  | (vii)               | <pre>SELECT ANO, COUNT(*), MIN(AMOUNT) FROM TRANSACT GROUP BY ANO HAVING COUNT(*) &gt; 1;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  | Ans                 | <table> <thead> <tr> <th><u>ANO</u></th> <th><u>COUNT (*)</u></th> <th><u>MIN (AMOUNT)</u></th> </tr> </thead> <tbody> <tr> <td>101</td> <td>2</td> <td>2500</td> </tr> <tr> <td>103</td> <td>2</td> <td>1000</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                              | <u>ANO</u>       | <u>COUNT (*)</u>    | <u>MIN (AMOUNT)</u> | 101             | 2              | 2500  | 103 | 2 | 1000 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| <u>ANO</u>       | <u>COUNT (*)</u>    | <u>MIN (AMOUNT)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 101              | 2                   | 2500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 103              | 2                   | 1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | <i>(½ Mark for correct output)<br/>NOTE: Values may be written in any order</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  | (viii)              | <pre>SELECT COUNT(*), SUM(AMOUNT) FROM TRANSACT WHERE DOT &lt;= '2017-06-01';</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  | Ans                 | <table> <thead> <tr> <th><u>COUNT (*)</u></th> <th><u>SUM (AMOUNT)</u></th> </tr> </thead> <tbody> <tr> <td>2</td> <td>5000</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                | <u>COUNT (*)</u> | <u>SUM (AMOUNT)</u> | 2                   | 5000            |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| <u>COUNT (*)</u> | <u>SUM (AMOUNT)</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 2                | 5000                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 6                | (a)                 | State any one Absorption Law of Boolean Algebra and verify it using truth table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  | Ans                 | $X + X \cdot Y = X$ <b>Verification:</b> <table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th><math>X \cdot Y</math></th> <th><math>X+X \cdot Y</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>                                                                                                                                                   | X                | Y                   | $X \cdot Y$         | $X+X \cdot Y$   | 0              | 0     | 0   | 0 | 0    | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |   |   |   |   |   |   |   |   |   |   |  |
| X                | Y                   | $X \cdot Y$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $X+X \cdot Y$    |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 0                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 1                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 0                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 1                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | $X \cdot (X + Y) = X$ <b>Verification:</b> <table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th><math>X+Y</math></th> <th><math>X \cdot (X+Y)</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>                                                                                                                                                     | X                | Y                   | $X+Y$               | $X \cdot (X+Y)$ | 0              | 0     | 0   | 0 | 0    | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |   |   |   |   |   |   |   |   |   |   |  |
| X                | Y                   | $X+Y$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | $X \cdot (X+Y)$  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 0                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 1                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 0                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 1                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | $X + X' \cdot Y = X + Y$ <b>Verification:</b> <table border="1"> <thead> <tr> <th>X</th> <th>Y</th> <th><math>X'</math></th> <th><math>X' \cdot Y</math></th> <th><math>X+X' \cdot Y</math></th> <th><math>X+Y</math></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table> | X                | Y                   | $X'$                | $X' \cdot Y$    | $X+X' \cdot Y$ | $X+Y$ | 0   | 0 | 1    | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |  |
| X                | Y                   | $X'$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $X' \cdot Y$     | $X+X' \cdot Y$      | $X+Y$               |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 0                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                | 0                   | 0                   |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0                | 1                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                | 1                   | 1                   |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 0                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                | 1                   | 1                   |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1                | 1                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                | 1                   | 1                   |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|                  |                     | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                     |                     |                 |                |       |     |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

|     | <p><math>X \cdot (X' + Y) = X \cdot Y</math></p> <p><b>Verification:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>X</th><th>Y</th><th><math>X'</math></th><th><math>X' + Y</math></th><th><math>X \cdot (X' + Y)</math></th><th><math>X \cdot Y</math></th></tr> </thead> <tbody> <tr> <td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr> <td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr> <td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> | X    | Y             | $X'$               | $X' + Y$      | $X \cdot (X' + Y)$ | $X \cdot Y$ | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |   |   |   |   |   |   |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|--------------------|---------------|--------------------|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| X   | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $X'$ | $X' + Y$      | $X \cdot (X' + Y)$ | $X \cdot Y$   |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 1             | 0                  | 0             |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 1             | 0                  | 0             |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 0             | 0                  | 0             |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 1             | 1                  | 1             |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     | <p>(1 Mark for stating any one Absorption Law correctly)<br/>         (1 Mark for correctly verifying the stated Law using Truth Table)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| (b) | Draw the Logic Circuit of the following Boolean Expression:<br>$(U' + V) \cdot (V' + W')$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2    |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Ans |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     | <p>(Full 2 Marks for drawing the Logic Circuit for the expression correctly)<br/>         OR<br/>         (½ Mark for drawing Logic circuit for <math>(U' + V)</math> correctly)<br/>         (½ Mark for drawing Logic circuit for <math>(V' + W')</math> correctly)</p>                                                                                                                                                                                                                                                                                                                                                                      |      |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| (c) | Derive a Canonical POS expression for a Boolean function FN, represented by the following truth table:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1    |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th><th>Y</th><th>Z</th><th><math>FN(X, Y, Z)</math></th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>                                         | X    | Y             | Z                  | $FN(X, Y, Z)$ | 0                  | 0           | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |  |
| X   | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Z    | $FN(X, Y, Z)$ |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 1             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 1             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 0             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 0             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 1             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 0             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0    | 0             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1    | 1             |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Ans | $FN(X, Y, Z) = (X+Y'+Z) \cdot (X+Y'+Z') \cdot (X'+Y+Z') \cdot (X'+Y'+Z)$ OR<br>$FN(X, Y, Z) = \prod(2, 3, 5, 6)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     | <p>(1 Mark for correctly writing the POS form)<br/>         OR<br/>         (½ Mark for any two correct terms)<br/> <i>Note: Deduct ½ mark if wrong variable names are written in the expression</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |               |                    |               |                    |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

|  |                                                                                                                               |   |
|--|-------------------------------------------------------------------------------------------------------------------------------|---|
|  | <p>(d) Reduce the following Boolean Expression to its simplest form using K-Map:</p> $G(U,V,W,Z) = \sum(3,5,6,7,11,12,13,15)$ | 3 |
|--|-------------------------------------------------------------------------------------------------------------------------------|---|



OR



$$F(U,V,W,Z) = VZ + WZ + UVW' + U'VW$$

(½ Mark for drawing K-Map and correctly plotting 1s in the given cells)  
 (½ Mark each for 4 groupings)

(½ Mark for writing final expression in reduced/minimal form)

Note:

- Deduct ½ mark if wrong variable names are used

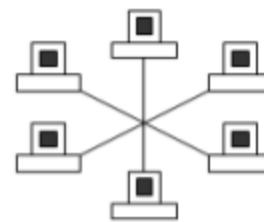
|  |                                                                                                                                                              |   |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <p>7 (a) Differentiate between Bus Topology and Star Topology of Networks. What are the advantages and disadvantages of Star Topology over Bus Topology?</p> | 2 |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

Ans

| <b>Bus Topology</b>                                                                  | <b>Star Topology</b>                                                                                       |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| It is characterised by common transmission medium shared by all the connected nodes. | It is characterised by central switching node connected directly to each of multiple nodes in the network. |

OR

| <b>Bus Topology</b> | <b>Star Topology</b> |
|---------------------|----------------------|
|---------------------|----------------------|



**Advantages of Star Topology over Bus Topology**

- Faster communication as compared to Bus topology
- Independent line of connection allows freedom of removing or adding nodes from the network

**Disadvantages of Star Topology over Bus Topology**

- Expensive as compared to Bus topology
- Long cable length

**(1 Mark for writing any correct difference between Bus and Star Topology)**

**(½ Mark for writing any correct advantage of Star Topology over Bus)**

**(½ Mark for writing any correct disadvantage of Star Topology over Bus)**

**(b)** Classify each of the following Web Scripting as Client Side Scripting and Server Side Scripting:

- (i) JavaScript      (ii) ASP      (iii) VB Scripting      (iv) JSP

2

**Ans** (i) Client Side Scripting / Server Side Scripting      (ii) Server Side Scripting  
 (iii) Client Side Scripting      (iv) Server Side Scripting

**(½ Mark for writing each correct classification)**

**(c)** Write the expanded names for the following abbreviated terms used in Networking and Communications:

- (i) SMTP      (ii) VoIP      (iii) GSM      (iv) WLL

2

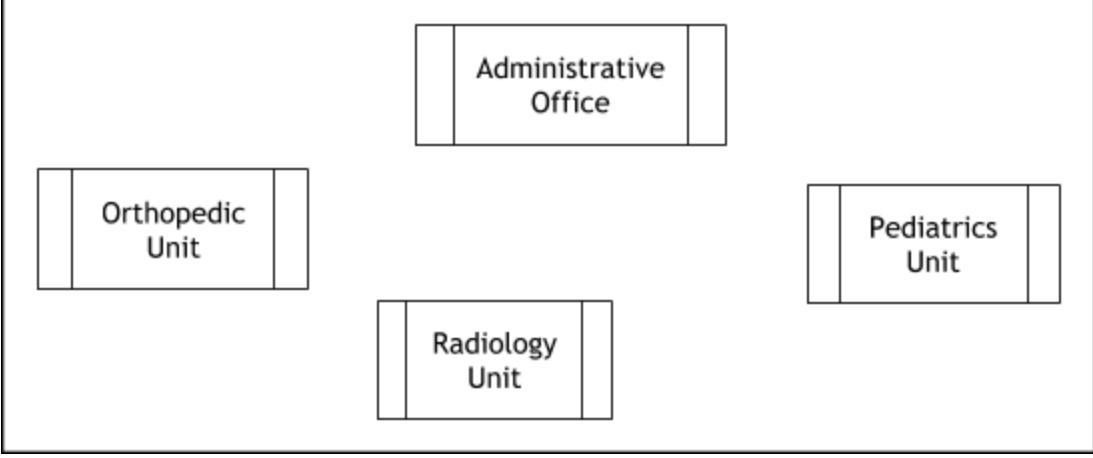
**Ans** (i) Simple Mail Transfer Protocol  
 (ii) Voice over Internet Protocol (Voice over IP)  
 (iii) Global System for Mobile Communication  
 (iv) Wireless Local Loop

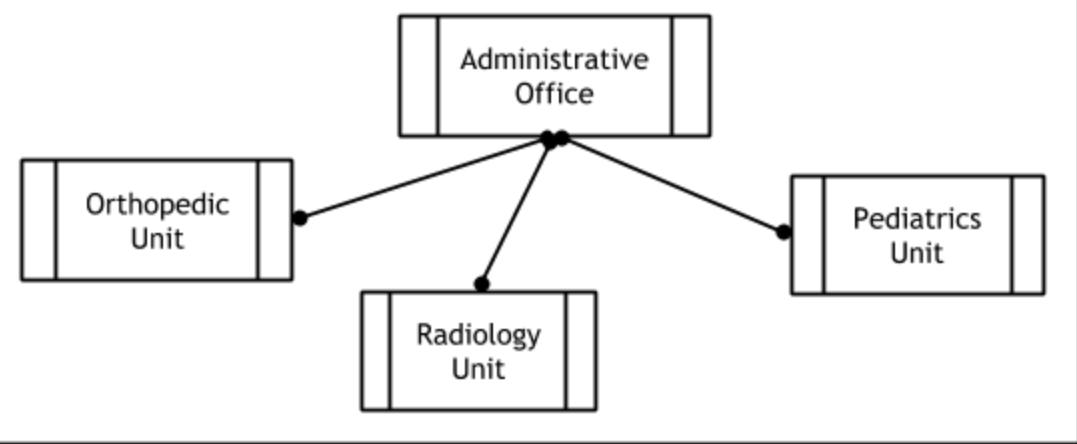
**(½ Mark for writing each correct expansion)**

**(d)** CASE STUDY BASED QUESTION:

Ayurveda Training Educational Institute is setting up its centre in Hyderabad with four specialised departments for Orthopedics, Neurology and Pediatrics along with an administrative office in separate buildings. The physical distances between these department buildings and the number of computers to be installed in these departments and administrative office as given as follows. You as a network

**CBSE AISSCE 2017-2018 Marking Scheme for Computer Science**  
 (2018-2019 Sub Code: 083 Paper Code: 91)

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----|-----------------------------------------|-----|------------------------------------|----|-----------------------------------|----|------------------------------------------|----|-------------------------------------|-----|--|
|                                           | expert have to answer the queries as raised by them in (i) to (iv).                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
|                                           | <p>Shortest distances between various locations in metres:</p> <table border="1"> <tr> <td>Administrative Office to Orthopedics Unit</td><td>55</td></tr> <tr> <td>Neurology Unit to Administrative Office</td><td>30</td></tr> <tr> <td>Orthopedics Unit to Neurology Unit</td><td>70</td></tr> <tr> <td>Pediatrics Unit to Neurology Unit</td><td>50</td></tr> <tr> <td>Pediatrics Unit to Administrative Office</td><td>40</td></tr> <tr> <td>Pediatrics Unit to Orthopedics Unit</td><td>110</td></tr> </table> | Administrative Office to Orthopedics Unit | 55 | Neurology Unit to Administrative Office | 30  | Orthopedics Unit to Neurology Unit | 70 | Pediatrics Unit to Neurology Unit | 50 | Pediatrics Unit to Administrative Office | 40 | Pediatrics Unit to Orthopedics Unit | 110 |  |
| Administrative Office to Orthopedics Unit | 55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Neurology Unit to Administrative Office   | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Orthopedics Unit to Neurology Unit        | 70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Pediatrics Unit to Neurology Unit         | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Pediatrics Unit to Administrative Office  | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Pediatrics Unit to Orthopedics Unit       | 110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
|                                           | <p>Number of Computers installed at the various locations are as follows:</p> <table border="1"> <tr> <td>Pediatrics Unit</td><td>40</td></tr> <tr> <td>Administrative Office</td><td>140</td></tr> <tr> <td>Neurology</td><td>50</td></tr> <tr> <td>Orthopedics Unit</td><td>80</td></tr> </table>                                                                                                                                                                                                                 | Pediatrics Unit                           | 40 | Administrative Office                   | 140 | Neurology                          | 50 | Orthopedics Unit                  | 80 |                                          |    |                                     |     |  |
| Pediatrics Unit                           | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Administrative Office                     | 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Neurology                                 | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| Orthopedics Unit                          | 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| (i)                                       | Suggest the most suitable location to install the main server of this institution to get efficient connectivity.                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                         |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| <b>Ans</b>                                | <b>Administrative Office</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
|                                           | <b><i>(1 Mark for writing correct location)</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |
| (ii)                                      | Suggest the best cable layout for effective network connectivity of the building having server with all the other buildings.                                                                                                                                                                                                                                                                                                                                                                                        | 1                                         |    |                                         |     |                                    |    |                                   |    |                                          |    |                                     |     |  |

|            |                                                                                                                                                                                                                                                                                  |   |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>Ans</b> |                                                                                                                                                                                                |   |
|            | <p><b>OR</b></p> <p>Administrative Office is connected to Orthopedic, Radiology, Pediatrics units directly in a Star Topology</p>                                                                                                                                                |   |
|            | <b>(1 Mark for drawing/writing the layout correctly)</b>                                                                                                                                                                                                                         |   |
| (iii)      | Suggest the devices to be installed in each of these buildings for connecting computers installed within the building out of the following:<br><ul style="list-style-type: none"> <li>● Gateway</li> <li>● Modem</li> <li>● Switch</li> </ul>                                    | 1 |
| Ans        | Switch                                                                                                                                                                                                                                                                           |   |
|            | <b>(1 Mark for writing the correct device)</b>                                                                                                                                                                                                                                   |   |
| (iv)       | Suggest the topology of the network and network cable for efficiently connecting each computer installed in each of the buildings out of the following:<br>Topologies : Bus topology, Star Topology<br>Network Cable: Single Pair Telephone Cable, Coaxial Cable, Ethernet Cable | 1 |
| Ans        | <b>Topology : Star Topology</b><br>Network Cable: Ethernet Cable / Coaxial Cable                                                                                                                                                                                                 |   |
|            | <b>(½ Mark for writing the correct topology)</b><br><b>(½ Mark for writing the correct network cable)</b>                                                                                                                                                                        |   |

Roll No.

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Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **16** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

## COMPUTER SCIENCE

*Time allowed : 3 hours*

*Maximum marks : 70*

**General Instructions :**

- (i) **SECTION A** refers to programming language C++.
- (ii) **SECTION B** refers to programming language Python.
- (iii) **SECTION C** is compulsory for all.
- (iv) Answer either **SECTION A** or **SECTION B**.
- (v) It is compulsory to mention on the page **1** in the answer book whether you are attempting **SECTION A** or **SECTION B**.
- (vi) All questions are compulsory within each section.

### SECTION – A

**(Only for Candidates, who opted for C++)**

1. (a) Write the type of C++ tokens (keywords and user defined identifiers) from the following : 2
  - (i) case
  - (ii) \_delete
  - (iii) WHILE
  - (iv) 21stName

- (b) Jayneel has just started learning C++. He typed the following C++ code and during the compilation of the code, he got some errors. When Jayneel asked his teacher, the teacher told him to include necessary header files in the code. 1

Write the names of those header files, which Jayneel needs to include, for successful compilation and execution of the following code.

```
void main()
{
    cout <<"We win !"<<endl;
    cout <<strlen("The World")<<endl ;
}
```

- (c) Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all header files required in the code are already being included.

```
#define 10*Number MAX(Number)
void main()
{
    int Num, NewNum;
    cout<<"Number:" ;
    cin<<Num;
    if Num<10
        NewNum=MAX (Num) ;
    else
        NewNum=Num-2;
    cout<<"New Number:" <<NewNum<<endl;
}
```

- (d) Find and write the output of the following C++ program code : 2

Note : Assume all required header files are already included in the program.

```
void Decider(int &K,int L=70)
{
    if (K>L)
        K-=L;
    else
        K+=L;
}
void main()
{
```

```

        int M=100,N=40;
        Decider(M, N);
        cout<<M<<"#"<<N<<endl;
        Decider(M);
        cout<<N<<"#"<<M<<endl;
    }

```

- (e) Find and write the output of the following C++ program code : 3

Note : Assume all required header files are already being included in the program.

```

void DispScore(int S[],int N)
{
    for(int Count = 0;Count<N;Count++)
        cout<<S[Count]<<"#";
    cout<<endl;
}
void main()
{
    int *Point,Score[]={10,5,20,15};
    Point=Score;
    DispScore(Score,2);
    for(int Count=0; Count<4; Count++)
    {
        cout<<*Point<<":";
        if(Count%2==0)
            Point++;
        else
        {
            *Point +=10;
            Point++;
        }
    }
    cout<<endl;
    DispScore(Score,4);
}

```

- (f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables Low and High. 2

Note :

- Assume all the required header files are already being included in the code.
- The function random(n) generates an integer between 0 and n – 1.

```

void main()
{
    randomize();
    int Low=2+random(3), High=5+random(3);
    int C[] = "ABCDEFGHIJ";

    for(int I=Low; I<=High; I++)
        cout<<C[I];
    cout<<endl;
}

```

|             |              |
|-------------|--------------|
| (i)         | (ii)         |
| <b>BCDE</b> | <b>CDEF</b>  |
| (iii)       | (iv)         |
| <b>CDE</b>  | <b>DCEFG</b> |

2. (a) Differentiate between Data Hiding and Data Encapsulation in context of Object Oriented Programming. Also give a suitable example illustrating the same in C++. 2  
 (b) Observe the following C++ code and answer the questions (i) and (ii).

Note : Assume all necessary files are included.

```

class GAME
{
    int Pcode, Round, Score;

public:
    GAME ()                                //Member Function 1
    {
        Pcode=1; Round=0; Score=0;
    }
    GAME (GAME &G)                      //Member Function 2
    {
        Pcode=G.Pcode+1;
        Round=G.Round+2;
        Score=G.Score+10;
    }
};

void main()
{
    _____                                //Statement 1
    _____                                //Statement 2
}

```

- (i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class GAME ? 1
- (ii) Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively. 1
- (c) Write the definition of a class FRAME in C++ with following description : 4
- Private Members
- ```

- FID          // data member of integer type
- Height       // data member of float type
- Width        // data member of float type
- Amount        // data member of float type
- GetAmount()  // Member function to calculate and assign
               // Amount as 10*Height*Width

```
- Public Members
- ```

- GetDetail() // A function to allow user to enter values of
               // FID, Height, Width. This Function should
               // also call GetAmount() function to calculate
               // Amount

- DispDetail() // A function to display the
               // values of all data members

```
- (d) Answer the questions (i) to (iv) based on the following : 4
- ```

class DIGITAL
{
    int ID;
protected:
    float Amount;
    int Seconds;
public:
    DIGITAL();
    void Register(); void Disp();
};

class PRINT
{
    int PID;
protected:
    float Amount;
    int SQinch;
public:
    PRINT();
    void Get();
    void Print();
};

class MEDIA : Public PRINT, private DIGITAL
{
    int MID;
}

```

```

public:
    MEDIA();
    void Enter();
    void Print();
};

void main()
{
    MEDIA M;          //Statement 1
    _____;           //Statement 2
}

```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?  
 – Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
- (ii) Write the names of all the member functions, which are directly accessible by the object M of class MEDIA as declared in main( ) function.
- (iii) What will be the order of execution of the constructors, when the object M of class MEDIA is declared inside main ( ) ?
- (iv) Write Statement 2 to call function Print( ) of class PRINT from the object M of class MEDIA.

3. (a) Write the definition of a function MIXER(int A[], int N) in C++, which should multiply 2 to the odd values present in the array and multiply 3 to the even values present in the array. The entire content of the array A having N elements should change without using any other array. 2

Example : if the array Arr contains

23	20	5	11	10
----	----	---	----	----

Then the array should become

46	60	10	22	30
----	----	----	----	----

Note :

- The function should not display the content of the array.
- (b) Write definition for a function TOPBOTTOM(int M[][],int N,int M) in C++, which finds and displays sum of the values in topmost row and sum of the values in bottommost row of a matrix M (Assuming the parameter N represents number of Row and the parameter M represents number of Columns). 3

For example, if the content of array M having N as 4 and M as 5 is as follows :

10	20	30	40	50
12	15	32	4	15
38	4	11	24	15
5	10	15	20	25

The function should find the sum and display the same as :

Sum of Top Row : 150

Sum of Bottom Row : 75

- (c) G[15][20] is a two dimensional array, which is stored in the memory along the column with each of its element occupying 4 bytes, find the address of the element G[5] [10], if the element G[2] [4] is stored at the memory location 52000. 3

- (d) Write the definition of a member function PUSHBOOK( ) in C++ to add information of BOOK in a static stack implemented using an array of structure BOOK (definition of struct BOOK is defined below for reference). 4

```
struct BOOK
{
    int BNO;
    char TITLE[20];
};
```

- (e) Evaluate the following Postfix expression showing the stack contents for each step of conversion. 2

50, 40, -, 4, 5, \*, +

4. (a) Write a function definition ARTICLES() in C++ to count all the articles “the”, “a” and “an” present in a text file “BOOK.TXT”. 3

Note : Ensure that “the”, “a” and “an” are counted as independent words and not as a part of any other word.

Example :

If the following is content in the file **BOOK.TXT** :

```
We should choose a low fat diet. The chef is really good
in the hotel. An article came in the newspaper about him.
```

The function **ARTICLE()** should display the following output :

```
5
```

- (b) Write definition of a function CALSAL( ) in C++ to find the total salary paid to all the workers in a company. The worker's detail of this company is stored in a binary file WORKERS.DAT. 2

Assume that the file WORKERS.DAT is created with the help of objects of class WORKER, which is defined below :

```
class WORKER
{
    int WID; char Name[20];
    float Salary;
```

```

public:
    void INPUT()
    {
        cin>>WID; gets (Name) ; cin>>Salary;
    }
    void OUTPUT()
    {
        cout<<WID<<" :" <<Name<<endl;
        cout<<Salary<<endl;
    }
    float *GetSal() {return Salary; }
};

```

- (c) Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 350 products. **1**

```

class PRODUCT
{
    int PCode;char PName[20];
public:
    void Entry();void Disp();
};

void main()
{
    fstream In;
    In.open("PRODUCT.DAT",ios::binary|ios::in);
    PRODUCT P;
    In.seekg(0,ios::end);
    cout<<"Total Count: "<<In.tellg()/sizeof(P)<<endl;
    In.seekg(70*sizeof(P));
    In.read((char*)&P, sizeof(P));
    In.read((char*)&P, sizeof(P));
    cout<<"At Product:"<<In.tellg()/sizeof(P) + 1;
    In.close();
}

```

**SECTION – B**  
**(Only for Candidates, who opted for Python)**

1. (a) Which of the following can be used as valid variable identifier(s) in Python ? 2

- (i) **elif**
- (ii) **BREAK**
- (iii) **in**
- (iv) **\_Total**

- (b) Name the Python Library modules which need to be imported to invoke the following functions : 1

- (i) **ceil()**
- (ii) **randint()**

- (c) Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code. 2

```
NUM1=1234
1=DAY1
for C in range[1,4]:
    NUM+C=NUM1
    DAY1=DAY1+2
    print C
print NUM1:DAY1
```

- (d) Find and write the output of the following Python code : 2

```
L1 = [100, 900, 300, 400, 500]
START = 1
SUM = 0
for C in range (START, 4):
    SUM = SUM + L1[C]
    print C,":",SUM
    SUM = SUM + L1[0]*10
    print SUM
```

- (e) Find and write the output of the following Python code : 3

```
class BOX:
    def __init__(self,C=1,L=1,B=1,H=1): #constructor
        self.C=C
        self.L=L
        self.B=B;
        self.H=H;
    def New(self,Size):
        self.L = self.L + Size
        self.B = self.B + Size
    def Raise(self,Height):
        self.H = self.H + Height
    def Dimension(self):
        print self.C,":",self.L,"x",self.B,"x",self.H
B1=BOX()
B2=BOX(15,5,4)
B3=BOX(101,3,2,4)
B1.Raise(10)
```

- ```

B1.Dimension()
B3.New(5)
B3.Dimension()
B2.New(15)
B2.Dimension()

```
- (f) What are the possible outcome(s) executed from the following code ? Also specify the maximum and minimum values that can be assigned to variable N. 2
- ```

import random
PLAY=[40,50,10,20]"EAST", "WEST", "NORTH", "SOUTH";
ROUND=random.randint(2,3)
for J in range(ROUND,1,-1):
    print PLAY[J],""

```
- |            |                |
|------------|----------------|
| (i) 20:10: | (ii) 20:10:50: |
| (iii) 20:  | (iv) 40:50:20: |
2. (a) List four characteristics of Object Oriented Programming. 2
- (b) **class ITEM:**
- ```

Ino = 1
Qty = 75
def Get(self,I,Q):                      #function 1
    Ino = I
    Qty = Q
def __init__(self,I,Q):                  #function 2
    self.Ino = I
    self.Qty = Q
def Display(self):                      #function 3
    print self.Ino,self.Qty
print Ino,Qty

```
- (i) Differentiate between function 1 and function 2 with respect to their execution.
- (ii) Write statements, which will execute function 1 and function 2.
- (c) Define a class RING in Python with following specifications : 4
- Instance Attributes**
- RingID # Numeric value with a default value 101
  - Radius # Numeric value with a default value 10
  - Area # Numeric value
- Methods :**
- AreaCal() # Method to calculate Area as  
# 3.14\*Radius\*Radius
  - NewRing() # Method to allow user to enter values of  
# RingID and Radius. It should also  
# Call AreaCal Method

```

- ViewRing() # Method to display all the Attributes
Instance Attributes
- FID          # data member of integer type
- Height       # data member of float type
- Width        # data member of float type
- Amount        # data member of float type
Methods :
- GetAmount()# Member function to calculate and assign
             # Amount as 10*Height*Width
- GetDetail()# A function to allow user to enter values of
             # FID, Height, Width. This function should
             # also call GetAmount() function to calculate
             # Amount
- DispDetail()# A function to display the
             # values of all data members

```

- (d) Write a program in Python to input a number and display its each digit reversed.

Example :

If the number is 6534

The program should display 4345

2

- (e) Write any two features that make it an important characteristic of Object Oriented Programming.

2

3. (a) What will be the status of the following list after the First, Second and Third pass of the bubble sort method used for arranging the following elements in **descending order** ?

3

Note : Show the status of all the elements after each pass very clearly underlining the changes.

**52, -10, 34, 60, -19, 20**

- (b) Write definition of a method **ZeroEndingSum(POINTS)** to add those values in the list of POINTS, which are ending with 0.

3

- (c) Write AddScore(GAME) and DelScore(GAME) methods in Python to Add a new SCORE in the list of scores of a GAME and Remove a SCORE from a list of scores of a GAME, considering these methods to act as PUSH and POP operations of the data structure Stack.

4

- (d) Write definition of a Method SEARCHNAME(MEMBERS, NAME) to search and display the serial number of first presence of a NAME from a list of MEMBERS. 2

For example :

If the list of MEMBERS contain

```
["ZAHEEN", "TOM", "CATHERINE", "AMIT", "HEENA"]
```

And

The NAME to search is "**CATHERINE**"

The following should get displayed

3

- (e) Evaluate the following Postfix notation of expression : 2

```
20, 30, +, 180, 20, 3, *, /, -
```

4. (a) Differentiate between file modes **r+** and **r** with respect to Python. 1

- (b) Write a method in Python to read lines from a text file NOTES.TXT, and count those lines, which are ending with '.' or ','. 2

- (c) Considering the following definition of class FURNITURE, write a method in Python to search and display the content in a pickled file COMPANY.DAT, where FTYPE is matching with the value 'HOME'. 3

```
class FURNITURE:
```

```
    def __init__(self, CODE, FTYPE, PRICE):
        self.CODE      =  CODE
        self.FTYPE     =  FTYPE
        self.PRICE     =  1000

    def Display(self):
        print self.CODE, ":", self.FTYPE, ":", self.PRICE
```

**SECTION – C**  
**(For all the Candidates)**

5. (a) Observe the following table CANDIDATE carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in OUTPUT ? Also, find the Degree and Cardinality of the OUTPUT. 2

**TABLE \_ A**

| <b>NO</b> | <b>ALPHA</b> |
|-----------|--------------|
| C1        | X            |
| C2        | Y            |
| C3        | Z            |

**TABLE \_ B**

| <b>CODE</b> | <b>VALUE</b> |
|-------------|--------------|
| 101         | 3000         |
| 102         | 4000         |

**OUTPUT**

| <b>NO</b> | <b>ALPHA</b> | <b>CODE</b> | <b>VALUE</b> |
|-----------|--------------|-------------|--------------|
| C1        | X            | 101         | 3000         |
| C1        | X            | 102         | 4000         |
| C2        | Y            | 101         | 3000         |
| C2        | Y            | 102         | 4000         |
| C3        | Z            | 101         | 3000         |
| C3        | Z            | 102         | 4000         |

- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables : 6

**TABLE : SALESPERSON**

| <b>Code</b> | <b>NAME</b>  | <b>SALARY</b> | <b>ITCODE</b> |
|-------------|--------------|---------------|---------------|
| 1001        | TANDEEP JHA  | 60000         | I2            |
| 1002        | YOGRAJ SINHA | 70000         | I5            |
| 1003        | TENZIN JACK  | 45000         | I2            |
| 1005        | ANOKHI RAJ   | 50000         | I7            |
| 1004        | TARANA SEN   | 55000         | I7            |

**TABLE : ITEM**

| <b>ITCODE</b> | <b>ITEMTYPE</b> | <b>TURNOVER</b> |
|---------------|-----------------|-----------------|
| I5            | STATIONARY      | 3400000         |
| I7            | HOSIERY         | 6500000         |
| I2            | BAKERY          | 10090000        |

- (i) To display the CODE and NAME of all SALESPERSON having “I7” Item Type Code from the table SALESPERSON.
- (ii) To display all details from table SALESPERSON in descending order of SALARY.
- (iii) To display the number of SALESPERSON dealing in each TYPE of ITEM. (Use ITCODE for the same)
- (iv) To display NAME of all the salespersons from the SALESPERSON table along with their corresponding ITEMTYPE from the ITEM table.
- (v) **SELECT MAX(SALARY) FROM SALESPERSON;**
- (vi) **SELECT DISTINCT ITCODE FROM SALESPERSON;**
- (vii) **SELECT CODE, NAME, I.ITCODE  
FROM SALESPERSON S, ITEM I  
WHERE S.ITCODE=I.ITCODE AND TURNOVER>=700000;**
- (viii) **SELECT SUM(SALARY) FROM SALESPERSON  
WHERE ITCODE="I2";**

6. (a) State Absorption Laws of Boolean Algebra and verify them using truth table. 2
- (b) Draw the Logic Circuit of the following Boolean Expression using only NOR Gates : 2
- A. B' + C**

- (c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table : 1

| <b>A</b> | <b>B</b> | <b>C</b> | <b>F (A, B, C)</b> |
|----------|----------|----------|--------------------|
| 0        | 0        | 0        | 0                  |
| 0        | 0        | 1        | 1                  |
| 0        | 1        | 0        | 0                  |
| 0        | 1        | 1        | 1                  |
| 1        | 0        | 0        | 0                  |
| 1        | 0        | 1        | 0                  |
| 1        | 1        | 0        | 1                  |
| 1        | 1        | 1        | 1                  |

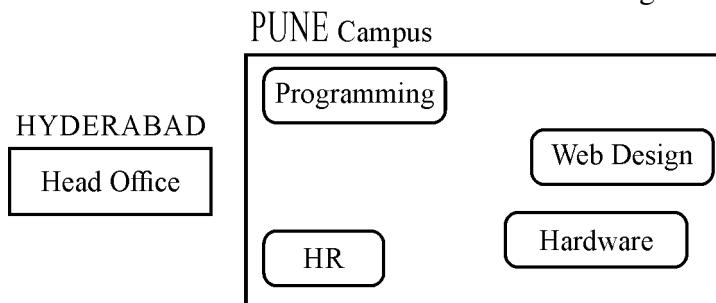
- (d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(P, Q, R, S) = \Sigma(0, 1, 2, 3, 4, 5, 6, 9, 13)$$

7. (a) Write one name of wireless and one wired communication medium. 2
- (b) Name any two private Internet Service Providers (company) in India. 2
- (c) Pratibha is an IT expert and a freelancer. She is undertakes those jobs, which are related to setting up security software/tools and managing networks in various companies. If we name her role in these companies, what it will be out of the following : 2
- (i) Cracker
  - (ii) Network Admin
  - (iii) Hacker
  - (iv) Operator (justify the reason for you chosen option)

- (d) Go-Fast corporation is a Hyderabad based company, which is planning to set up training campuses in various cities in next 3 years. Their first campus is coming up in Pune. At Pune campus, they are planning to have 4 different blocks for HR, Web Design Training, Programming Training and Hardware Training. Each block has number of computers, which are required to be connected in a network for communication, data and resource sharing.

As a network consultant of this company, you have to suggest the best network related solutions for them for issues/problems raised in (i) to (iv), keeping in mind the distances between various blocks/locations and other given parameters.



Shortest distances between various blocks/locations :

|                                       |            |
|---------------------------------------|------------|
| Programming Block to HR Block         | 60 metres  |
| Programming Block to Web Design Block | 50 metres  |
| Programming Block to Hardware Block   | 70 metres  |
| HR Block to Web Design Block          | 120 metres |
| HR Block to Hardware Block            | 85 metres  |
| HYDERABAD Head Office to PUNE Campus  | 504 Km     |

Number of Computers installed at various blocks are as follows :

|                   |     |
|-------------------|-----|
| HR Block          | 10  |
| Programming Block | 100 |
| Web Design Block  | 60  |
| Hardware          | 40  |

- (i) Suggest the most appropriate block/location to house the SERVER in the PUNE Campus (out of the 4 blocks) to get the best and effective connectivity. Justify your answer. **1**
- (ii) Suggest a device/software to be installed in the PUNE Campus to take care of data security. **1**
- (iii) Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various Blocks within the PUNE campus. **1**
- (iv) Suggest a device and the protocol that shall be needed to provide Video Conferencing solution between PUNE Campus and Hyderabad Head Office. **1**
-

# CBSE AISSCE 2016-2017 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

## General Instructions:

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

## SECTION A - (Only for candidates, who opted for C++)

|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|---|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a) | Write the type of C++ tokens (keywords and user defined identifiers) from the following:<br>(i) For<br>(ii) delete<br>(iii) default<br>(iv) Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 |
|   | Ans | (i) For - user defined identifier<br>(ii) delete - keyword<br>(iii) default - keyword<br>(iv) Value - user defined identifier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|   |     | <i>(1/2 Mark for writing each correct keywords)</i><br><i>(1/2 Mark for writing each correct user defined identifiers)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|   | (b) | Anil typed the following C++ code and during compilation he found four errors as follows:<br>(i) Function strlen should have a prototype<br>(ii) Undefined symbol cout<br>(iii) Undefined symbol endl<br>(iv) Function getchar should have a prototype<br>On asking his teacher told him to include necessary header files in the code.<br>Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code:<br><pre>void main() {     char S[] = "Hello";     for(int i = 0; i&lt;strlen(S); i++)         S[i] = S[i]+1;     cout&lt;&lt;S&lt;&lt;endl;     getchar(); }</pre> | 1 |

# CBSE AISSCE 2016-2017 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

|  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |
|--|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|  | <b>Ans</b> | <b>iostream.h or iomanip.h or fstream.h<br/>string.h<br/>stdio.h</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
|  |            | <b>(½ Mark each for writing any two correct header files)</b><br><br><b>NOTE:</b><br><b>Ignore additional header file(s)</b>                                                                                                                                                                                                                                                                                                                                                                                                            |          |
|  | <b>(c)</b> | Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.<br><br>Note: Assume all required header files are already being included in the program.<br><pre>void main() {     cout&lt;&lt;"Enter an integer";     cin&gt;&gt;N;     switch(N%2)         case 0 cout&lt;&lt;"Even"; Break;         case 1 cout&lt;&lt;"Odd" ; Break; }</pre>                                                                                                                                              | <b>2</b> |
|  | <b>Ans</b> | <pre>void main() {     <u>int N;</u>                                // Error 1     cout&lt;&lt;"Enter an integer";     cin&gt;&gt;N;     switch(N%2)         <u>{</u>                                // Error 2 (i)         case 0:                            // Error 3 (i)             cout&lt;&lt;"Even"; <u>break;</u> // Error 4 (i)         case 1:                            // Error 3 (ii)             cout&lt;&lt;"Odd" ; <u>break;</u> // Error 4 (ii)     <u>}</u>                                // Error 2 (ii) }</pre> |          |
|  |            | <b>(½ Mark for correcting Error 1)</b><br><b>(½ Mark for correcting Error 2(i) and Error 2(ii))</b><br><b>(½ Mark for correcting Error 3(i) and Error 3(ii))</b><br><b>(½ Mark for correcting Error 4(i) and Error 4(ii))</b><br><b>OR</b><br><b>(1 Mark for identifying all the errors without corrections)</b>                                                                                                                                                                                                                        |          |
|  | <b>(d)</b> | Find and write the output of the following C++ program code:<br><br>Note: Assume all required header files are already included in the program.<br><pre>#define Big(A,B) (A&gt;B) ?A+1:B+2 void main()</pre>                                                                                                                                                                                                                                                                                                                            | <b>2</b> |

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|     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|-----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     |     | <pre> {     char W[] = "Exam";     int L=strlen(W);     for(int i =0; i&lt;L-1; i++)         W[i] = Big(W[i],W[i+1]);     cout&lt;&lt;W&lt;&lt;endl; } </pre>                                                                                                                                                                                                                                                                                                                       |   |
|     | Ans | <b>zyom</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|     |     | <p><i>(½ Mark for writing each correct value)<br/>Deduct ½ Mark for writing the values in different lines</i></p>                                                                                                                                                                                                                                                                                                                                                                   |   |
| (e) |     | <p>Find and write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre> void main() {     int A[]={10,12,15,17,20,30};     for(int i = 0; i&lt;6; i++)     {         if(A[i]%2==0)             A[i] /= 2;         else if(A[i]%3==0)             A[i] /= 3;         if(A[i]%5==0)             A[i] /= 5;     }     for(i = 0; i&lt;6; i++)         cout&lt;&lt;A[i]&lt;&lt;"#"; } </pre> | 3 |
|     | Ans | <b>1#6#1#17#2#3#</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|     |     | <p><i>(½ Mark for writing each correct value)<br/>Note: Deduct ½ Mark for not considering any/all # as separator and or writing the values in different lines</i></p>                                                                                                                                                                                                                                                                                                               |   |
| (f) |     | <p>Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables R and C.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>• Assume all the required header files are already being included in the code.</li> <li>• The function random(n) generates an integer between 0 and n-1</li> </ul> <pre> void main() {     randomize(); } </pre>         | 2 |

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```

int R=random(3),C=random(4);
int MAT[3][3] = {{10,20,30},{20,30,40},{30,40,50}};
for(int I=0; I<R; I++)
{
    for(int J=0; J<C; J++)
        cout<<MAT[I][J]<<"   ";
    cout<<endl;
}

```

| (i)                              | (ii)                    |
|----------------------------------|-------------------------|
| 10 20 30<br>20 30 40<br>30 40 50 | 10 20 30<br>20 30 40    |
| (iii)                            | (iv)                    |
| 10 20<br>20 30                   | 10 20<br>20 30<br>30 40 |

**Ans** (ii) and (iii)  
*Max Value of R:2*  
*Max Value of C:3*

**(1 Mark for writing the correct options)**  
**NOTE: No marks to be awarded for writing any other option or any other combination**  
**(½ Mark for writing correct Maximum value of R)**  
**(½ Mark for writing correct Maximum value of C)**

2. (a) Differentiate between private and public members of a class in context of Object Oriented Programming. Also give a suitable example illustrating accessibility/non-accessibility of each using a class and an object in C++. 2

|            |                                        |                                    |
|------------|----------------------------------------|------------------------------------|
| <b>Ans</b> | <b>private</b>                         | <b>public</b>                      |
|            | Implicit Visibility Mode               | Explicit Visibility Mode           |
|            | Not accessible by the objects of class | Accessible by the objects of class |

Example:

```

class A
{
    int x;      //private Member
public:
    void In(); //public member
};
void main()
{
    A obja;
    cin>>obja.x;//Not Accessible
    obja.In();//accessible
}

```

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|  |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|--|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |      | <p><b>OR</b></p> <p>Any other correct example demonstrating difference between private and public members of a class</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|  |      | <p><i>(Full 2 Marks for any one correct difference between private and public members of a class using a suitable code in C++)</i></p> <p><b>OR</b></p> <p><i>(1 Mark for writing correct difference between private and public members in a class without example)</i></p>                                                                                                                                                                                                                                                                                                                                                                             |   |
|  | (b)  | <p>Observe the following C++ code and answer the questions (i) and (ii).<br/>Note: Assume all necessary files are included.</p> <pre> <b>class EXAM</b> {     long Code;     char EName[20];     float Marks; public:     EXAM()                                //Member Function 1     {         Code=100; strcpy(EName, "Noname") ;Marks=0;     }     EXAM(EXAM &amp;E)                         //Member Function 2     {         Code=E.Code+1;         strcpy(EName, E.EName);         Marks=E.Marks;     } }; void main() {     _____                                //Statement 1     _____                                //Statement 2 } </pre> |   |
|  | (i)  | Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class EXAM?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1 |
|  | Ans  | <b>Polymorphism OR Constructor overloading OR Function Overloading</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|  |      | <i>(1Mark for mentioning the correct concept name )</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|  | (ii) | Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 |
|  | Ans  | <pre> EXAM E1;                                //Statement 1  EXAM E2(E1);                            //Statement 2 OR EXAM E2=E1;                            //Statement 2 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
|--|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | ( <i>½ Mark for writing statement 1 correctly</i> )<br>( <i>½ Mark for writing statement 2 correctly</i> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|  | (c) | <p>Write the definition of a class RING in C++ with following description:</p> <p>Private Members</p> <pre> - RingNumber // data member of integer type - Radius     // data member of float type - Area       // data member of float type - CalcArea() // Member function to calculate and assign               // Area as 3.14 * Radius*Radius </pre> <p>Public Members</p> <pre> - GetArea() // A function to allow user to enter values of             // RingNumber and Radius. Also, this             // function should call CalcArea() to calculate             // Area - ShowArea() // A function to display RingNumber, Radius             // and Area </pre> | 4 |
|  | Ans | <pre> class RING {     int RingNumber ;     float Radius ;     float Area ;     void CalcArea(){Area=3.14*Radius*Radius;} public:     void GetArea();     void ShowArea(); };  void RING::GetArea() {     cin&gt;&gt;RingNumber&gt;&gt;Radius;     CalcArea(); } void RING::ShowArea() {     cout&lt;&lt;RingNumber&lt;&lt;" "&lt;&lt;Radius&lt;&lt;" "&lt;&lt;Area&lt;&lt;endl; } </pre>                                                                                                                                                                                                                                                                                |   |
|  |     | <p>(<i>½ Mark for declaring class header correctly</i>)</p> <p>(<i>½ Mark for declaring data members correctly</i>)</p> <p>(<i>1 Mark for defining CalcArea() correctly</i>)</p> <p>(<i>½ Mark for taking inputs of RingNumber and Radius in GetArea()</i>)</p> <p>(<i>½ Mark for invoking CalcArea() inside GetArea()</i>)</p> <p>(<i>½ Mark for defining ShowArea() correctly</i>)</p> <p>(<i>½ Mark for correctly closing class declaration with a semicolon ; )</i></p> <p><b>NOTE:</b></p> <p><i>Marks to be awarded for defining the member functions inside or outside the class</i></p>                                                                          |   |
|  | (d) | Answer the questions (i) to (iv) based on the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4 |
|  |     | <pre> class One { </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |

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```

int A1;
protected:
float A2;
public:
One();
void Get1(); void Show1();
};

class Two : private One
{
int B1;
protected:
float B2;
public:
Two();
void Get2();
void Show();
};

class Three : public Two
{
int C1;
public:
Three();
void Get3();
void Show();
};

void main()
{
    Three T;           //Statement 1
    _____; //Statement 2
}

```

- (i) Which type of Inheritance out of the following is illustrated in the above example?  
 -Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance

**Ans** **Multilevel Inheritance**

***(1 Mark for writing correct option)***

- (ii) Write the names of all the member functions, which are directly accessible by the object T of class Three as declared in main() function.

**Ans** **Get3(), Show() of class Three**  
**Get2(), Show() of class Two**  
**OR**  
**Get3(), Show() OR Three::Show()**  
**Get2(), Two::Show()**

***(1 Mark for writing all correct function names )***

**NOTE:**

- ***Marks not to be awarded for partially correct answer***
- ***Ignore the mention of Constructors***

- (iii) Write Statement 2 to call function Show() of class Two from the object T of class Three.

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|          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|----------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|---|---|----|----|----|----|---|---|---|---|---|---|
|          | <b>Ans</b> | <b>T.Two::Show()</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          |            | <b>(1 Mark for writing Statement 2 correctly)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          | (iv)       | What will be the order of execution of the constructors, when the object T of class Three is declared inside main()?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          | <b>Ans</b> | <b>One,Two, Three</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          |            | <b>(1 Mark for writing correct order)</b><br><b>NOTE:</b> <ul style="list-style-type: none"><li>● No Marks to be awarded for any other combination/order.</li><li>● Names of the constructor/class without parenthesis is acceptable</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
| <b>3</b> | (a)        | <p>Write the definition of a function Reverse(int Arr[], int N) in C++, which should reverse the entire content of the array Arr having N elements, without using any other array.</p> <p>Example: if the array Arr contains</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>13</td> <td>10</td> <td>15</td> <td>20</td> <td>5</td> </tr> </table> <p>Then the array should become</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>5</td> <td>20</td> <td>15</td> <td>10</td> <td>13</td> </tr> </table> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>● The function should only rearrange the content of the array.</li> <li>● The function should not copy the reversed content in another array.</li> <li>● The function should not display the content of the array.</li> </ul> | 13 | 10 | 15 | 20 | 5 | 5 | 20 | 15 | 10 | 13 | 3 |   |   |   |   |   |
| 13       | 10         | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 20 | 5  |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
| 5        | 20         | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10 | 13 |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          | <b>Ans</b> | <pre>void Reverse(int Arr[],int N) {     for (int I=0;I&lt;N/2;I++)     {         int T=Arr[I];         Arr[I]=Arr[N-I-1];         Arr[N-I-1]=T;     } }</pre> <p><b>OR</b></p> <p>Any other correct alternative code in C++</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          |            | <b>(1 ½ Mark for correctly writing the loop)</b><br><b>(1 ½ Mark for correctly writing the logic for reversing the content)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |    |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
|          | (b)        | <p>Write definition for a function ADDMIDROW(int MAT[][][10],int R,int C) in C++, which finds sum of the middle row elements of the matrix MAT (Assuming C represents number of Columns and R represents number of rows, which is an odd integer).</p> <p>For example, if the content of array MAT having R as 3 and C as 5 is as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>2</td> <td>1</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>3</td> <td>4</td> <td>1</td> <td>2</td> <td>5</td> </tr> </table>                                                                                                                                                                                                                                 | 1  | 2  | 3  | 4  | 5 | 2 | 1  | 3  | 4  | 5  | 3 | 4 | 1 | 2 | 5 | 2 |
| 1        | 2          | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4  | 5  |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
| 2        | 1          | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4  | 5  |    |    |   |   |    |    |    |    |   |   |   |   |   |   |
| 3        | 4          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2  | 5  |    |    |   |   |    |    |    |    |   |   |   |   |   |   |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|--|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | The function should calculate the sum and display the following:<br>Sum of Middle Row: 15                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|  | Ans | <pre>void ADDMIDROW(int MAT[][][10],int R,int C) {     int MIDR=0;     for (int J=0;J&lt;C;J++)         MIDR+=MAT[R/2][J];     cout&lt;&lt;"Sum of Middle Row:"&lt;&lt;MIDR&lt;&lt;endl; }</pre> <p>OR<br/>Any other correct alternative code in C++</p>                                                                                                                                                                                                                                                                                              |   |
|  |     | <p><i>(½ Mark for correctly writing the loop)<br/>(1 Mark for adding middle row elements)<br/>(½ Mark for displaying the sum of middle row elements)</i></p>                                                                                                                                                                                                                                                                                                                                                                                          |   |
|  | (c) | T[25][30] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 2 bytes, find the address of the element T[10][15], if the element T[5][10] is stored at the memory location 25000.                                                                                                                                                                                                                                                                                                              | 3 |
|  | Ans | <pre>LOC(T[I][J]) = Base(T)+W*(NC*I+J) LOC(T[5][10]) = Base(T)+2*(30*5+10) 25000          = Base(T)+2*(30*5+10) Base(T)         = 25000 - 2*(160) Base(T)         = 25000 - 320 Base(T)         = 24680  LOC(T[10][15]) = 24680 + 2*(30*10+15)                 = 24680 + 2*(315)                 = 24680 + 630                 = 25310</pre> <p>OR</p> <pre>LOC(T[10][15]) = LOC(T[5][10]) + 2(30*(10-5) + (15-10))                 = 25000 + 2(150 + 5)                 = 25000 + 2(155)                 = 25000 + 310                 = 25310</pre> |   |
|  |     | <p><i>(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)<br/>(1Mark for correct calculation)<br/>(1 Mark for final correct address)</i></p>                                                                                                                                                                                                                                                                                                                                                             |   |
|  | (d) | <p>Write the definition of a member function ADDMEM() for a class QUEUE in C++, to add a MEMBER in a dynamically allocated Queue of Members considering the following code is already written as a part of the program.</p> <pre>struct Member {     int MNO;     char MNAME[20];     Member *Next;</pre>                                                                                                                                                                                                                                             | 4 |

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```

};

class QUEUE
{
    Member *Rear,*Front;
public:
    QUEUE () {Rear=NULL;Front=NULL; }
    void ADDMEM();
    void REMOVEMEM();
    ~QUEUE ();
};

```

**ANS** `void QUEUE::ADDMEM()`

```

{
    Member *T;
    T=new Member;
    cin>>T->MNO;
    gets (T->MNAME) ;
    T->Next=NULL;
    if (Rear==NULL)
    {
        Rear=T;Front=T;
    }
    else
    {
        Rear->Next=T;
        Rear=T;
    }
}

```

OR

Any other equivalent code in C++

*(1 Mark for creating a new Node)*

*(1 Mark for accepting values of MNO and MNAME)*

*(½ Mark for checking EMPTY condition)*

*(½ Mark for assigning NULL to Rear and Front as T)*

*(½ Mark for connecting Rear with T)*

*(½ Mark for assigning Rear as T)*

- (e)** Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.

$P + ( Q - R ) * S / T$

**Ans** `(P+(((Q-R)*S)/T))`

| INFIX | STACK | POSTFIX |
|-------|-------|---------|
| P     |       | P       |
| +     | +     | P       |
| Q     | +     | PQ      |
| -     | --    | PQ      |
| R     | --    | PQR     |

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|   |    |           |
|---|----|-----------|
| ) | +  | PQR-      |
| * | +* | PQR-      |
| S | +* | PQR-S     |
| ) | +  | PQR-S*    |
| / | +/ | PQR-S*    |
| T | +/ | PQR-S*T   |
| ) | +  | PQR-S*T/  |
| ) |    | PQR-S*T/+ |

**OR**

| INFIX | STACK | POSTFIX   |
|-------|-------|-----------|
| (     | (     |           |
| P     | (     | P         |
| +     | (+    | P         |
| (     | (+(   | P         |
| Q     | (+(   | PQ        |
| -     | (+(-  | PQ        |
| R     | (+(-  | PQR       |
| )     | (+    | PQR-      |
| *     | (+*   | PQR-      |
| S     | (+*   | PQR-S     |
| /     | (+ /  | PQR-S*    |
| T     | (+ /  | PQR-S*T   |
| )     |       | PQR-S*T/+ |

*(½ Mark for conversion upto each operator illustrating through stack)*

**OR**

*(1 Mark for only the final answer as PQR-S\*T/+)*

4. (a) Aditi has used a text editing software to type some text. After saving the article as WORDS.TXT, she realised that she has wrongly typed alphabet J in place of alphabet I everywhere in the article.
- Write a function definition for JTOI() in C++ that would display the corrected version of entire content of the file WORDS.TXT with all the alphabets “J” to be displayed as an alphabet “I” on screen.
- Note: Assuming that WORD.TXT does not contain any J alphabet otherwise.
- Example:
- If Aditi has stored the following content in the file WORDS.TXT:
- WELL, THJS JS A WORD BY JTSELF. YOU COULD STRETCH THJS TO BE  
A SENTENCE
- The function JTOI() should display the following content:
- WELL, THIS IS A WORD BY ITSELF. YOU COULD STRETCH THIS TO BE

3

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|  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                              |
|--|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  |            | <b>A SENTENCE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |
|  | <b>Ans</b> | <pre> void JTOI() {     char ch;     ifstream F("WORDS.TXT" );     while(F.get(ch))     {         if(ch=='J')             ch='I';         cout&lt;&lt;ch;     }     F.close(); //IGNORE } </pre> <p><b>OR</b></p> <p>Any other correct function definition</p>                                                                                                                                                                                                                                                                                                       | <pre> OR fstream F; F.open("WORDS.TXT", ios::in); OR fstream F("WORDS.TXT", ios::in); </pre> |
|  |            | <p>(1 Mark for opening WORDS.TXT / WORD.TXT correctly)<br/>         (1 Mark for reading each character (using any method) from the file)<br/>         (1 Mark for displaying 'I' in place of 'J')</p>                                                                                                                                                                                                                                                                                                                                                                |                                                                                              |
|  | (b)        | <p>Write a definition for function COUNTDEPT( ) in C++ to read each object of a binary file TEACHERS.DAT, find and display the total number of teachers in the department MATHS. Assume that the file TEACHERS.DAT is created with the help of objects of class TEACHERS, which is defined below:</p> <pre> class TEACHERS {     int TID; char DEPT[20]; public:     void GET()     {         cin&gt;&gt;TID; gets(DEPT);     }      void SHOW()     {         cout&lt;&lt;TID&lt;&lt;" : "&lt;&lt;DEPT&lt;&lt;endl;     }     char *RDEPT(){return DEPT;} }; </pre> | 2                                                                                            |
|  | <b>Ans</b> | <pre> void COUNTDEPT() {     ifstream F;     F.open ("TEACHERS.DAT",             ios::binary);     int count=0;     Teachers obj; </pre>                                                                                                                                                                                                                                                                                                                                                                                                                             | <pre> OR fstream F; F.open ("TEACHERS.DAT", ios::binary ios::in); </pre>                     |

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```

while(F.read((char*)&obj,
              sizeof(obj)))
{
    if(strcmp(obj.RDEPT(),"MATHS")==0)
        count++;
}
cout<<"Number of MATHS teachers :"<<count<<endl;
F.close(); //IGNORE
}
OR
Any other correct function definition

```

(½ Mark for opening TEACHERS.DAT correctly)  
 (½ Mark for reading records from TEACHERS.DAT)  
 (½ Mark for comparing DEPT of type MATHS(ignore case sensitive checking) with strcmp or strcmpl)  
 (½ Mark for displaying the incremented count for matching records)

- (c) Find the output of the following C++ code considering that the binary file BOOK.DAT exists on the hard disk with a data of 200 books. 1

```

class BOOK
{
    int BID;char BName[20];
public:
    void Enter();void Display();
};
void main()
{
    fstream InFile;
    InFile.open("BOOK.DAT",ios::binary|ios::in);
    BOOK B;
    InFile.seekg(5*sizeof(B));
    InFile.read((char*)&B, sizeof(B));
    cout<<"Book Number:"<<InFile.tellg()/sizeof(B) + 1;
    InFile.seekg(0,ios::end);
    cout<<" of "<<InFile.tellg()/sizeof(B)<<endl;
    InFile.close();
}

```

**Ans** Book Number: 7 of 200

(½ Mark for displaying correct value of InFile.tellg()/sizeof(B) + 1)  
 (½ Mark for displaying correct value of InFile.tellg()/sizeof(B))

## SECTION B - (Only for candidates, who opted for Python)

|   |            |                                                                                                                                             |   |
|---|------------|---------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a)        | Which of the following can be used as valid variable identifier(s) in Python<br>(i) total<br>(ii) 7Salute<br>(iii) Que\$tion<br>(iv) global | 2 |
|   | <b>Ans</b> | (i) total                                                                                                                                   |   |

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```

    self.Ino=I
    self.IName=N
    self.Qty=int(Q);
def Buy(self,Q):
    self.Qty = self.Qty + Q
def Sell(self,Q):
    self.Qty -= Q
def ShowStock(self):
    print self.Ino,":",self.IName,"#",self.Qty
I1=ITEM()
I2=ITEM(100,"Eraser",100)
I3=ITEM(102,"Sharpener")
I1.Buy(10)
I2.Sell(25)
I3.Buy(75)
I3.ShowStock()
I1.ShowStock()
I2.ShowStock()

```

**Ans**

102 : Sharpener # 85  
 101 : Pen # 20  
 100 : Eraser # 75

*(1 mark for each correct line of output)*

**NOTE:**

- Deduct ½ Mark for not writing any or all ‘:’ or ‘#’ symbol(s)
- Deduct ½ Mark for not considering any or all line breaks at proper place(s)

**(f)** What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable N. 2

```

import random
SIDES= ["EAST", "WEST", "NORTH", "SOUTH"];
N=random.randint(1,3)
OUT=""
for I in range(N,1,-1):
    OUT=OUT+SIDES[I]
print OUT

```

|                |                     |
|----------------|---------------------|
| (i) SOUTHNORTH | (ii) SOUTHNORTHWEST |
| (iii) SOUTH    | (iv) EASTWESTNORTH  |

**Ans** (i) SOUTHNORTH

Maximum value of N = 3

Minimum value of N = 1

*(1 mark for correct option)*

**NOTE:** No marks to be awarded for writing any other option or any other combination

*( ½ each for maximum and minimum value of N)*

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|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|---|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| 2 | (a) | List four characteristics of Object Oriented programming.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2 |
|   | Ans | <b>Encapsulation</b><br><b>Data Hiding</b><br><b>Abstraction</b><br><b>Inheritance</b><br><b>Polymorphism</b> <p style="margin-top: 10px;"><i>( ½ mark for each characteristic upto four characteristics)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
|   | (b) | <pre>class Test:     rollno=1     marks=75     def __init__(self,r,m):         self.rollno=r         self.marks=m     def assign(self,r,m):         rollno = r         marks = m     def check(self):         print self.rollno,self.marks         print rollno,marks</pre> <p>(i) In the above class definition, both the functions - function 1 as well as function 2 have similar definition. How are they different in execution?<br/> (ii) Write statements to execute function 1 and function 2.</p>                                                                                                                                                                     | 2 |
|   | Ans | <p>i) Function 1 is the constructor which gets executed automatically as soon as the object of the class is created. Function 2 is a member function which has to be called to assign the values to rollno and marks.</p> <p>ii) Function 1    E1=Test(1,95) # Any values in the parameter<br/> Function 2    E1.assign(1,95) # Any values in the parameter</p> <p><i>(1 mark for correct difference)</i><br/> <i>( ½ mark for each statement for executing Function 1 and function 2 )</i></p>                                                                                                                                                                                |   |
|   | (c) | <p>Define a class RING in Python with following specifications</p> <p><b>Instance Attributes</b></p> <ul style="list-style-type: none"> <li>- RingID # Numeric value with a default value 101</li> <li>- Radius # Numeric value with a default value 10</li> <li>- Area # Numeric value</li> </ul> <p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>- AreaCal() # Method to calculate Area as<br/> # <math>3.14 * \text{Radius} * \text{Radius}</math></li> <li>- NewRing() # Method to allow user to enter values of<br/> # RingID and Radius. It should also<br/> # Call AreaCal Method</li> <li>- ViewRing() # Method to display all the Attributes</li> </ul> | 4 |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
| Ans | <pre>class RING: # OR class RING( ): OR class RING(Object):     def __init__(self):         self.RingID=101         self.Radius=10         self.Area=0      def AreaCal(self):         self.Area=3.14*self.Radius*self.Radius      def NewRing(self):         self.RingID=input("Enter RingID")         self.Radius=input("Enter radius")         self.AreaCal() # OR AreaCal(self)      def ViewRing(self):         print self.RingID         print self.Radius         print self.Area</pre> <p>(½ Mark for correct syntax for class header)<br/> (½ Mark for correct declaration of instance attributes)<br/> (1 Mark for correct definition of AreaCal() function)<br/> (1 Mark for correct definition of NewRing() with invocation of AreaCal( ))<br/> (1 Mark for correct definition of ViewRing())</p> <p><b>NOTE:</b><br/> Deduct ½ Mark if AreaCal() is not invoked properly inside NewRing() function</p> |   |
| (d) | Differentiate between static and dynamic binding in Python? Give suitable examples of each.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 |
| Ans | <p>Static Binding: It allows linking of function call to the function definition during compilation of the program.</p> <p>Dynamic Binding: It allows linking of a function during run time. That means the code of the function that is to be linked with function call is unknown until it is executed. Dynamic binding of functions makes the programs more flexible.</p> <p>(1 mark for each correct explanation of static and dynamic binding)<br/> <b>OR</b><br/> (1 for each correct example of static and dynamic binding)</p>                                                                                                                                                                                                                                                                                                                                                                              |   |
| (e) | <p>Write two methods in Python using concept of Function Overloading (Polymorphism) to perform the following operations:</p> <ul style="list-style-type: none"> <li>(i) A function having one argument as side, to calculate Area of Square as <math>\text{side} * \text{side}</math></li> <li>(ii) A function having two arguments as Length and Breadth, to calculate Area of Rectangle as <math>\text{Length} * \text{Breadth}</math>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 |
| Ans | <pre>def Area(side):     print side*side  def Area(length,breadth):     print length*breadth</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |

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|-----|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|-----|-----|-----|-----|------------|-------------|-----|-----|-----|-----|-----|-------------|------------|-----|-----|-----|-----|-----|-------------|------------|-----|-----|-----|-----|-----|-------------|------------|-----|-----|-----|-----|-----|-------------|-----|------------|-----|-----|-----|------|-----|------------|------------|-----|-----|------|-----|-----|------------|------------|-----|------|-----|-----|-----|------------|------------|------|-----|-----|-----|-----|-----|------|-----|------------|-----|-----|-----|------|-----|------------|------------|-----|-----|------|-----|-----|------------|------------|-----|------|-----|-----|-----|-----|-----|------|--|
|     |            | <p><b>NOTE: Python does not support function overloading “as illustrated in the example shown above”. If you run the code, the second Area(B,H) definition will overwrite/override the first one.</b></p> <p>(1 mark for each function definition)<br/>OR<br/>(Full 2 Marks for mentioning Python does not support function overloading)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |             |             |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 3.  | (a)        | <p>What will be the status of the following list after the First, Second and Third pass of the bubble sort method used for arranging the following elements in descending order?</p> <p>Note: Show the status of all the elements after each pass very clearly underlining the changes.</p> <p>152, 104, -100, 604, 190, 204</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3           |             |             |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
|     | Ans        | <p>I Pass</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>152</td><td>104</td><td>-100</td><td>604</td><td>190</td><td>204</td></tr> <tr><td>152</td><td><b>104</b></td><td><b>-100</b></td><td>604</td><td>190</td><td>204</td></tr> <tr><td>152</td><td>104</td><td><b>-100</b></td><td><b>604</b></td><td>190</td><td>204</td></tr> <tr><td>152</td><td>104</td><td>604</td><td><b>-100</b></td><td><b>190</b></td><td>204</td></tr> <tr><td>152</td><td>104</td><td>604</td><td>190</td><td><b>-100</b></td><td><b>204</b></td></tr> <tr><td>152</td><td>104</td><td>604</td><td>190</td><td>204</td><td><b>-100</b></td></tr> </table> <p>II Pass</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>152</td><td><b>104</b></td><td>604</td><td>190</td><td>204</td><td>-100</td></tr> <tr><td>152</td><td><b>104</b></td><td><b>604</b></td><td>190</td><td>204</td><td>-100</td></tr> <tr><td>152</td><td>604</td><td><b>104</b></td><td><b>190</b></td><td>204</td><td>-100</td></tr> <tr><td>152</td><td>604</td><td>190</td><td><b>104</b></td><td><b>204</b></td><td>-100</td></tr> <tr><td>152</td><td>604</td><td>190</td><td>204</td><td>104</td><td>-100</td></tr> </table> <p>III Pass</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>152</td><td><b>604</b></td><td>190</td><td>204</td><td>104</td><td>-100</td></tr> <tr><td>604</td><td><b>152</b></td><td><b>190</b></td><td>204</td><td>104</td><td>-100</td></tr> <tr><td>604</td><td>190</td><td><b>152</b></td><td><b>204</b></td><td>104</td><td>-100</td></tr> <tr><td>604</td><td>190</td><td>204</td><td>152</td><td>104</td><td>-100</td></tr> </table> <p>(1 mark for last set of values of each correct pass)</p> | 152         | 104         | -100        | 604 | 190 | 204 | 152 | <b>104</b> | <b>-100</b> | 604 | 190 | 204 | 152 | 104 | <b>-100</b> | <b>604</b> | 190 | 204 | 152 | 104 | 604 | <b>-100</b> | <b>190</b> | 204 | 152 | 104 | 604 | 190 | <b>-100</b> | <b>204</b> | 152 | 104 | 604 | 190 | 204 | <b>-100</b> | 152 | <b>104</b> | 604 | 190 | 204 | -100 | 152 | <b>104</b> | <b>604</b> | 190 | 204 | -100 | 152 | 604 | <b>104</b> | <b>190</b> | 204 | -100 | 152 | 604 | 190 | <b>104</b> | <b>204</b> | -100 | 152 | 604 | 190 | 204 | 104 | -100 | 152 | <b>604</b> | 190 | 204 | 104 | -100 | 604 | <b>152</b> | <b>190</b> | 204 | 104 | -100 | 604 | 190 | <b>152</b> | <b>204</b> | 104 | -100 | 604 | 190 | 204 | 152 | 104 | -100 |  |
| 152 | 104        | -100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 604         | 190         | 204         |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | <b>104</b> | <b>-100</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 604         | 190         | 204         |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 104        | <b>-100</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>604</b>  | 190         | 204         |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 104        | 604                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>-100</b> | <b>190</b>  | 204         |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 104        | 604                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 190         | <b>-100</b> | <b>204</b>  |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 104        | 604                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 190         | 204         | <b>-100</b> |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | <b>104</b> | 604                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 190         | 204         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | <b>104</b> | <b>604</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 190         | 204         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 604        | <b>104</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>190</b>  | 204         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 604        | 190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>104</b>  | <b>204</b>  | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | 604        | 190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 204         | 104         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 152 | <b>604</b> | 190                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 204         | 104         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 604 | <b>152</b> | <b>190</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 204         | 104         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 604 | 190        | <b>152</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>204</b>  | 104         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
| 604 | 190        | 204                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 152         | 104         | -100        |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
|     | (b)        | <p>Write definition of a method OddSum(NUMBERS) to add those values in the list of NUMBERS, which are odd.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3           |             |             |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |
|     | Ans        | <pre>def OddSum(NUMBERS) :     n=len(NUMBERS)     s=0     for i in range(n):         if (i%2!=0):             s=s+NUMBERS[i]     print(s)</pre> <p>(½ mark for finding length of the list)<br/>( ½ mark for initializing s (sum) with 0)<br/>( ½ mark for reading each element of the list using a loop)<br/>( ½ mark for checking odd location)<br/>( ½ mark for adding it to the sum)<br/>( ½ mark for printing or returning the value)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |             |             |     |     |     |     |            |             |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |            |     |     |     |     |     |             |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |            |            |      |     |     |     |     |     |      |     |            |     |     |     |      |     |            |            |     |     |      |     |     |            |            |     |      |     |     |     |     |     |      |  |

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|         | (c)            | Write Addnew(Book) and Remove(Book) methods in Python to Add a new Book and Remove a Book from a List of Books, considering them to act as PUSH and POP operations of the data structure Stack.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4       |                |   |   |   |      |   |   |    |       |   |          |  |
|---------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------|---|---|---|------|---|---|----|-------|---|----------|--|
|         | Ans            | <pre>class stack:     Book=[]     def Addnew(self):         Name=input("Enter Book Name :")         stack.Book.append(Name)     def Remove(self):         if (stack.Book==[]):             print "Stack Empty"         else:             print "Deleted Book is : ",stack.Book.pop()</pre> <p>( <i>½ mark for Addnew header</i>)<br/> <i>( ½ mark for accepting a Book from user)</i><br/> <i>( 1 mark for adding value in list)</i><br/> <i>( ½ mark for Remove header)</i><br/> <i>( ½ mark for checking empty list condition)</i><br/> <i>( ½ mark for displaying Book getting removed)</i><br/> <i>( ½ mark for removing Book)</i></p> <p><b>NOTE:</b><br/> <i>Marks not to be deducted for methods written without using a class</i></p> |         |                |   |   |   |      |   |   |    |       |   |          |  |
|         | (d)            | <p>Write definition of a Method AFIND(CITIES) to display all the city names from a list of CITIES, which are starting with alphabet A.</p> <p>For example:<br/> If the list CITIES contains</p> <pre>[ "AHMEDABAD" , "CHENNAI" , "NEW DELHI" , "AMRITSAR" , "AGRA" ]</pre> <p>The following should get displayed</p> <p><b>AHMDABAD</b><br/> <b>AMRITSAR</b><br/> <b>AGRA</b></p>                                                                                                                                                                                                                                                                                                                                                             | 2       |                |   |   |   |      |   |   |    |       |   |          |  |
|         | Ans            | <pre>def AFIND(CITIES) :     for i in CITIES:         if i[0]=='A':             print i</pre> <p>( <i>½ mark function header</i>)<br/> <i>( ½ mark for loop)</i><br/> <i>( ½ mark for checking condition of first letter A)</i><br/> <i>( ½ mark for displaying value)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                |   |   |   |      |   |   |    |       |   |          |  |
|         | (e)            | Evaluate the following Postfix notation of expression:<br>$2, 3, *, 24, 2, 6, +, /, -$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2       |                |   |   |   |      |   |   |    |       |   |          |  |
|         | Ans            | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Element</th> <th style="text-align: center;">Stack Contents</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">2, 3</td> </tr> <tr> <td style="text-align: center;">*</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">24</td> <td style="text-align: center;">6, 24</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">6, 24, 2</td> </tr> </tbody> </table>                                          | Element | Stack Contents | 2 | 2 | 3 | 2, 3 | * | 6 | 24 | 6, 24 | 2 | 6, 24, 2 |  |
| Element | Stack Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |
| 2       | 2              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |
| 3       | 2, 3           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |
| *       | 6              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |
| 24      | 6, 24          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |
| 2       | 6, 24, 2       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                |   |   |   |      |   |   |    |       |   |          |  |

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|   |             |
|---|-------------|
| 6 | 6, 24, 2, 6 |
| + | 6, 24, 8    |
| / | 6, 3        |
|   | 3           |

Answer: 3

*(½ Mark for evaluation till each operator)*

*OR*

*(1 Mark for only writing the Final answer without showing stack status)*

|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|---|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 4 | (a) | Differentiate between file modes <b>r+</b> and <b>w+</b> with respect to Python.                                                                                                                                                                                                                                                                                                                                                                                                        | 1 |
|   | Ans | <ul style="list-style-type: none"> <li>• <b>r+</b> Opens a file for both reading and writing. The file pointer placed at the beginning of the file.</li> <li>• <b>w+</b> Opens a file for both writing and reading. Overwrites the existing file if the file exists. If the file does not exist, creates a new file for reading and writing.</li> </ul> <p><i>(1 mark for one of the correct difference )</i><br/> <i>OR</i><br/> <i>(½ Mark for each correct use of r+ and w+)</i></p> |   |
|   | (b) | Write a method in Python to read lines from a text file DIARY.TXT, and display those lines, which are starting with an alphabet 'P'.                                                                                                                                                                                                                                                                                                                                                    | 2 |
|   | Ans | <pre>def display():     file=open('DIARY.TXT', 'r')     line=file.readline()     while line:         if line[0]=='P' :             print line         line=file.readline()     file.close() #IGNORE</pre> <p><i>(½ Mark for opening the file)</i><br/> <i>(½ Mark for reading all lines)</i><br/> <i>(½ Mark for checking condition for line starting with P)</i><br/> <i>(½ Mark for displaying line)</i></p>                                                                          |   |
|   | (c) | Considering the following definition of class COMPANY, write a method in Python to search and display the content in a pickled file COMPANY.DAT, where CompID is matching with the value '1005'.                                                                                                                                                                                                                                                                                        | 3 |
|   |     | <pre>class Company:     def __init__(self,CID,NAM):         self.CompID = CID #CompID Company ID         self.CName = NAM #CName Company Name         self.Turnover = 1000     def Display(self):         print self.CompID,":",self.CName,":",self.Turnover</pre>                                                                                                                                                                                                                      |   |
|   | Ans | <pre>import pickle def ques4c( ):     f=Factory( )     file=open('COMPANY.DAT','rb')     try:</pre>                                                                                                                                                                                                                                                                                                                                                                                     |   |

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```

while True:
    f=pickle.load(file)
    if f.CompID==1005:
        f.Display()
    except EOF Error:
        pass
    file.close() #IGNORE
(1/2 Mark for correct function header)
(1/2 Mark for opening the file COMPANY.DAT correctly)
(1/2 Mark for correct loop)
(1/2 Mark for correct load( ))
(1/2 Mark for correct checking of CompID)
(1/2 Mark for displaying the record)

```

## SECTION C - (For all the candidates)

| 5    | (a)         | <p>Observe the following table CANDIDATE carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in RESULT ? Also, find the Degree and Cardinality of the RESULT.</p> <p><b>TABLE: CANDIDATE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">NO</th><th style="width: 40%;">NAME</th><th style="width: 35%;">STREAM</th></tr> </thead> <tbody> <tr> <td>C1</td><td>AJAY</td><td>LAW</td></tr> <tr> <td>C2</td><td>ADITI</td><td>MEDICAL</td></tr> <tr> <td>C3</td><td>ROHAN</td><td>EDUCATION</td></tr> <tr> <td>C4</td><td>RISHAB</td><td>ENGINEERING</td></tr> </tbody> </table> <p><b>RESULT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">NO</th><th style="width: 75%;">NAME</th></tr> </thead> <tbody> <tr> <td>C3</td><td>ROHAN</td></tr> </tbody> </table> | NO   | NAME  | STREAM | C1   | AJAY       | LAW     | C2   | ADITI       | MEDICAL    | C3 | ROHAN | EDUCATION | C4 | RISHAB | ENGINEERING | NO | NAME | C3 | ROHAN | 2 |
|------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|--------|------|------------|---------|------|-------------|------------|----|-------|-----------|----|--------|-------------|----|------|----|-------|---|
| NO   | NAME        | STREAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| C1   | AJAY        | LAW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| C2   | ADITI       | MEDICAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| C3   | ROHAN       | EDUCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| C4   | RISHAB      | ENGINEERING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| NO   | NAME        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| C3   | ROHAN       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
|      | Ans         | <p>(i) SELECTION and (ii) PROJECTION<br/>OR<br/>(i) SELECTION<br/>OR<br/>(ii) PROJECTION</p> <p>DEGREE = 2<br/>CARDINALITY = 1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
|      |             | <p><i>(1 Mark for writing the correct RDBMS operation as any one of the given options)</i><br/><i>(1/2 Mark for writing correct degree)</i><br/><i>(1/2 Mark for writing correct cardinality)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
|      | (b)         | <p>Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables</p> <p><b>TABLE : BOOK</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Code</th><th style="width: 50%;">BNAME</th><th style="width: 25%;">TYPE</th></tr> </thead> <tbody> <tr> <td>F101</td><td>The priest</td><td>Fiction</td></tr> <tr> <td>L102</td><td>German easy</td><td>Literature</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Code | BNAME | TYPE   | F101 | The priest | Fiction | L102 | German easy | Literature | 6  |       |           |    |        |             |    |      |    |       |   |
| Code | BNAME       | TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| F101 | The priest  | Fiction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |
| L102 | German easy | Literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |       |        |      |            |         |      |             |            |    |       |           |    |        |             |    |      |    |       |   |

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|      |                          |         |
|------|--------------------------|---------|
| C101 | Tarzan in the lost world | Comic   |
| F102 | Untold Story             | Fiction |
| C102 | War Heroes               | Comic   |

**TABLE: MEMBER**

| MNO  | MNAME        | CODE | ISSUEDATE  |
|------|--------------|------|------------|
| M101 | RAGHAV SINHA | L102 | 2016-10-13 |
| M103 | SARTHAK JOHN | F102 | 2017-02-23 |
| M102 | ANISHA KHAN  | C101 | 2016-06-12 |

- (i) To display all details from table MEMBER in descending order of ISSUEDATE.

**Ans** `SELECT * FROM MEMBER ORDER BY ISSUEDATE DESC;`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct ORDER BY clause)*

- (ii) To display the BNO and BNAME of all Fiction Type books from the table BOOK

**Ans** `SELECT Code,BNAME FROM BOOK WHERE TYPE='Fiction' ;`  
**OR**  
`SELECT BNO,BNAME FROM BOOK WHERE TYPE='Fiction' ;`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

**NOTE:**

*Full 1 Mark for mentioning BNO does not exist in table BOOK*

- (iii) To display the TYPE and number of books in each TYPE from the table BOOK

**Ans** `SELECT COUNT(*),TYPE FROM BOOK GROUP BY TYPE;`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct GROUP BY clause)*

- (iv) To display all MNAME and ISSUEDATE of those members from table MEMBER who have books issued (i.e ISSUEDATE) in the year 2017.

**Ans** `SELECT MNAME, ISSUEDATE FROM MEMBER WHERE  
ISSUEDATE>='2017-01-01' AND ISSUEDATE<='2017-12-31' ;`  
**OR**  
`SELECT MNAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE  
BETWEEN '2017-01-01' AND '2017-12-31' ;`  
**OR**  
`SELECT MNAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE  
LIKE '2017%';`

*(½ Mark for correct SELECT statement)  
(½ Mark for correct WHERE clause)*

- (v) `SELECT MAX(ISSUEDATE) FROM MEMBER;`

**Ans** **MAX(ISSUEDATE)**  
2017-02-23

# CBSE AISSCE 2016-2017 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

|             |                          | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
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|             | (vi)                     | <code>SELECT DISTINCT TYPE FROM BOOK;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | Ans                      | <u>DISTINCT TYPE</u><br><u>Fiction</u><br><u>Literature</u><br><u>Comic</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             |                          | <i>(½ Mark for correct output)</i><br><b>NOTE: Values may be written in any order</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | (vii)                    | <code>SELECT A.CODE,BNAME,MNO,MNAME FROM BOOK A, MEMBER B<br/>WHERE A.CODE=B.CODE ;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | Ans                      | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 30%;"><u>CODE</u></th> <th style="text-align: left; width: 30%;"><u>BNAME</u></th> <th style="text-align: left; width: 10%;"><u>MNO</u></th> <th style="text-align: left; width: 10%;"><u>MNAME</u></th> </tr> </thead> <tbody> <tr> <td>L102</td> <td>The priest</td> <td>M101</td> <td>RAGHAV SINHA</td> </tr> <tr> <td>F102</td> <td>Untold Story</td> <td>M103</td> <td>SARTHAK JOHN</td> </tr> <tr> <td>C101</td> <td>Tarzan in the lost world</td> <td>M102</td> <td>ANISHA KHAN</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <u>CODE</u>  | <u>BNAME</u> | <u>MNO</u> | <u>MNAME</u> | L102      | The priest | M101 | RAGHAV SINHA | F102 | Untold Story | M103 | SARTHAK JOHN | C101 | Tarzan in the lost world | M102 | ANISHA KHAN |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| <u>CODE</u> | <u>BNAME</u>             | <u>MNO</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <u>MNAME</u> |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| L102        | The priest               | M101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RAGHAV SINHA |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| F102        | Untold Story             | M103                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SARTHAK JOHN |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| C101        | Tarzan in the lost world | M102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ANISHA KHAN  |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             |                          | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | (viii)                   | <code>SELECT BNAME FROM BOOK<br/>WHERE TYPE NOT IN ("FICTION", "COMIC");</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | Ans                      | <u>BNAME</u><br>German Easy<br>OR<br><u>BNAME</u><br>The priest<br>German easy<br>Tarzan in the lost world<br>Untold Story<br>War heroes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             |                          | <i>(½ Mark for writing any one of the above two outputs)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 6           | (a)                      | State Distributive Laws of Boolean Algebra and verify them using truth table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2            |              |            |              |           |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|             | Ans                      | (i) $X \cdot (Y+Z) = X \cdot Y + X \cdot Z$<br>(ii) $X + Y \cdot Z = (X + Y) \cdot (X + Z)$<br><b>Truth Table Verification:</b><br>(i) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 10%;">X</th> <th style="text-align: center; width: 10%;">Y</th> <th style="text-align: center; width: 10%;">Z</th> <th style="text-align: center; width: 10%;">Y + Z</th> <th style="text-align: center; width: 10%;">X.(Y+Z)</th> <th style="text-align: center; width: 10%;">X.Y</th> <th style="text-align: center; width: 10%;">X.Z</th> <th style="text-align: center; width: 10%;">X.Y + X.Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">1</td> </tr> </tbody> </table> | X            | Y            | Z          | Y + Z        | X.(Y+Z)   | X.Y        | X.Z  | X.Y + X.Z    | 0    | 0            | 0    | 0            | 0    | 0                        | 0    | 0           | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| X           | Y                        | Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Y + Z        | X.(Y+Z)      | X.Y        | X.Z          | X.Y + X.Z |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0           | 0                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0            | 0            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0           | 0                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 0            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0           | 1                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 0            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0           | 1                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 0            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1           | 0                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0            | 0            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1           | 0                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 1            | 0          | 0            | 0         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1           | 1                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 1            | 1          | 0            | 1         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1           | 1                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1            | 1            | 1          | 1            | 1         |            |      |              |      |              |      |              |      |                          |      |             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

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(ii)

| X | Y | Z | Y.Z | X+Y.Z | (X+Y) | (X+Z) | (X+Y).(X+Z) |
|---|---|---|-----|-------|-------|-------|-------------|
| 0 | 0 | 0 | 0   | 0     | 0     | 0     | 0           |
| 0 | 0 | 1 | 0   | 0     | 0     | 1     | 0           |
| 0 | 1 | 0 | 0   | 0     | 1     | 0     | 0           |
| 0 | 1 | 1 | 1   | 1     | 1     | 1     | 1           |
| 1 | 0 | 0 | 0   | 1     | 1     | 1     | 1           |
| 1 | 0 | 1 | 0   | 1     | 1     | 1     | 1           |
| 1 | 1 | 0 | 0   | 1     | 1     | 1     | 1           |
| 1 | 1 | 1 | 1   | 1     | 1     | 1     | 1           |

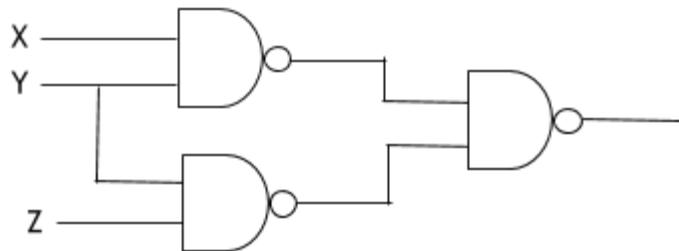


**(1 Mark for stating any one Distributive Law correctly)  
(1 Mark for correctly verifying any one Distributive Law using Truth Table)**

- (b) Draw the Logic Circuit of the following Boolean Expression using only NAND Gates:  

$$X \cdot Y + Y \cdot Z$$
 2

**Ans**



**(Full 2 Marks for drawing the Logic Circuit for the expression correctly)**

**OR**

**(½ Mark for drawing Logic circuit for (X NAND Y) correctly)  
(½ Mark for drawing Logic circuit for (Y NAND Z) correctly)**

- (c) Derive a Canonical SOP expression for a Boolean function F, represented by the following truth table: 1

| U | V | W | F(U, V, W) |
|---|---|---|------------|
| 0 | 0 | 0 | 1          |
| 0 | 0 | 1 | 0          |
| 0 | 1 | 0 | 1          |
| 0 | 1 | 1 | 1          |
| 1 | 0 | 0 | 0          |
| 1 | 0 | 1 | 0          |
| 1 | 1 | 0 | 1          |
| 1 | 1 | 1 | 0          |

**Ans**

$$F(U, V, W) = U'V'W' + U'VW' + U'VW + UVW'$$

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|        |            | <p><b>OR</b><br/> <math>F(U, V, W) = \Sigma(0, 2, 3, 6)</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|--------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------|-------|------|-------|--------|---|---|---|---|-------|---|---|--|--|------|---|--|--|---|-------|---|--|---|---|--|
|        |            | <p>(1 Mark for correctly writing the SOP form)<br/> <b>OR</b><br/>         (½ Mark for any two correct terms)<br/> <i>Note: Deduct ½ mark if wrong variable names are written in the expression</i></p>                                                                                                                                                                                                                                                                                                                                     |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        | (d)        | <p>Reduce the following Boolean Expression to its simplest form using K-Map:</p> $F(X, Y, Z, W) = \Sigma(0, 1, 2, 3, 4, 5, 10, 11, 14)$                                                                                                                                                                                                                                                                                                                                                                                                     | 3    |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        | <b>Ans</b> | <p><b>Ans</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th><math>X'Y'</math></th> <th><math>X'Y</math></th> <th><math>XY</math></th> <th><math>XY'</math></th> </tr> <tr> <th><math>Z'W'</math></th> <td>1</td> <td>1</td> <td></td> <td></td> </tr> <tr> <th><math>Z'W</math></th> <td>1</td> <td>1</td> <td></td> <td></td> </tr> <tr> <th><math>ZW</math></th> <td>1</td> <td></td> <td></td> <td>1</td> </tr> <tr> <th><math>ZW'</math></th> <td>1</td> <td></td> <td>1</td> <td>1</td> </tr> </table> |      | $X'Y'$ | $X'Y$ | $XY$ | $XY'$ | $Z'W'$ | 1 | 1 |   |   | $Z'W$ | 1 | 1 |  |  | $ZW$ | 1 |  |  | 1 | $ZW'$ | 1 |  | 1 | 1 |  |
|        | $X'Y'$     | $X'Y$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $XY$ | $XY'$  |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $Z'W'$ | 1          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $Z'W$  | 1          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $ZW$   | 1          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | 1      |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $ZW'$  | 1          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1    | 1      |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        |            | <p><b>OR</b></p> <table style="margin-left: auto; margin-right: auto;"> <tr> <th></th> <th><math>Z'W'</math></th> <th><math>Z'W</math></th> <th><math>ZW</math></th> <th><math>ZW'</math></th> </tr> <tr> <th><math>X'Y'</math></th> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <th><math>X'Y</math></th> <td>1</td> <td>1</td> <td></td> <td></td> </tr> <tr> <th><math>XY</math></th> <td></td> <td></td> <td></td> <td>1</td> </tr> <tr> <th><math>XY'</math></th> <td></td> <td></td> <td>1</td> <td>1</td> </tr> </table>  |      | $Z'W'$ | $Z'W$ | $ZW$ | $ZW'$ | $X'Y'$ | 1 | 1 | 1 | 1 | $X'Y$ | 1 | 1 |  |  | $XY$ |   |  |  | 1 | $XY'$ |   |  | 1 | 1 |  |
|        | $Z'W'$     | $Z'W$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $ZW$ | $ZW'$  |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $X'Y'$ | 1          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1    | 1      |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $X'Y$  | 1          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $XY$   |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | 1      |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| $XY'$  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1    | 1      |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        |            | $F(X, Y, Z, W) = X'Z' + Y'Z + XZW'$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        |            | <p>(½ Mark for drawing K-Map with correct variable names)<br/>         (½ Mark for correctly plotting 1s in the given cells)<br/>         (½ Mark each for 3 groupings)<br/>         (½ Mark for writing final expression in reduced/minimal form)<br/> <i>Note:</i></p> <ul style="list-style-type: none"> <li>• Deduct ½ mark if wrong variable names are used</li> <li>• Deduct ½ mark for any redundant group appearing in final expression</li> </ul>                                                                                  |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
| 7      | (a)        | Differentiate between Radio Link and Microwave in context of wireless communication technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2    |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |
|        | <b>Ans</b> | <b>Radio Link:</b> Data is transmitted outward from the antenna through free space in all directions. It is a Slow means of communication;                                                                                                                                                                                                                                                                                                                                                                                                  |      |        |       |      |       |        |   |   |   |   |       |   |   |  |  |      |   |  |  |   |       |   |  |   |   |  |

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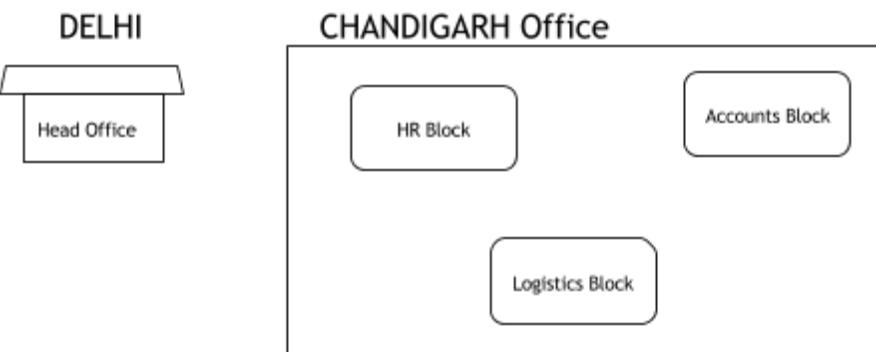
|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|--|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <p><b>Microwave:</b> Data is transmitted based on line of sight principle, faster than radio communication.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|  |     | <p><i>(Full 2 marks for any correct difference between Radio Link and Microwave)</i><br/> <b>OR</b><br/> <i>(1 Mark for writing correct features of any one wireless medium out of Radio Link or Microwave)</i></p>                                                                                                                                                                                                                                                                                                                                                   |   |
|  | (b) | <p>Amit used a pen drive to copy files from his friend's laptop to his office computer. Soon his office computer started abnormal functioning. Sometimes it would restart by itself and sometimes it would stop functioning totally. Which of the following options out of (i) to (iv), would have caused the malfunctioning of the computer. Justify the reason for your chosen option:</p> <ul style="list-style-type: none"> <li>(i) Computer Worm</li> <li>(ii) Computer Virus</li> <li>(iii) Computer Bacteria</li> <li>(iv) Trojan Horse</li> </ul>             | 2 |
|  | Ans | <p><b>(ii) Computer Virus</b><br/> <b>OR</b><br/> <b>(iv) Trojan Horse</b></p> <ul style="list-style-type: none"> <li>● Pen drive containing Computer Virus / Trojan Horse was used before the abnormal functioning started, which might have corrupted the system files.</li> <li>● Computer Virus/ Trojan Horse affects the system files and start abnormal functioning in the computer</li> </ul> <p><i>(1 Mark for writing any of the options (ii) OR (iv))</i><br/> <i>(1 Mark for writing any one correct justification)</i></p>                                |   |
|  | (c) | <p>Jai is an IT expert and a freelancer. He recently used his skills to access the Administrator password for the network server of Megatech Corp Ltd. and provided confidential data of the organization to its Director, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Jai. Justify the reason for your chosen option:</p> <ul style="list-style-type: none"> <li>(i) Hacker</li> <li>(ii) Cracker</li> <li>(iii) Operator</li> <li>(iv) Network Admin</li> </ul> | 2 |
|  | Ans | <p><b>(i) Hacker</b></p> <p>A Hacker is a person who breaks into the network of an organization without any malicious intent.</p> <p><i>(1 Mark for writing correct option)</i><br/> <i>(1 Mark for writing correct justification)</i></p>                                                                                                                                                                                                                                                                                                                            |   |
|  | (d) | <p>Hi Speed Technologies Ltd is a Delhi based organization which is expanding its office setup to Chandigarh. At Chandigarh office campus, they are planning to have 3 different blocks for HR, Accounts and Logistics related work. Each block has number of computers, which are required to be connected in a network for</p>                                                                                                                                                                                                                                      |   |

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communication, data and resource sharing.

As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised in (i) to (iv), keeping in mind the distances between various blocks/locations and other given parameters.



Shortest distances between various blocks/locations:

|                                        |            |
|----------------------------------------|------------|
| HR Block to Accounts Block             | 400 Metres |
| Accounts Block to Logistics Block      | 200 Metres |
| Logistics Block to HR Block            | 150Metres  |
| DELHI Head Office to CHANDIGARH Office | 270 Km     |

Number of Computers installed at various blocks are as follows:

|                 |    |
|-----------------|----|
| HR Block        | 70 |
| Account Block   | 50 |
| Logistics Block | 40 |

- (i) Suggest the most appropriate block/location to house the SERVER in the CHANDIGARH Office (out of the 3 Blocks) to get the best and effective connectivity. Justify your answer. 1

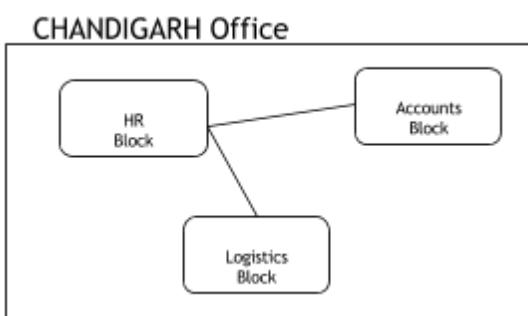
Ans **HR Block - Because it has maximum number of computers.**

*(½ Mark for correct Block/location)*

*(½ Mark for valid justification)*

- (ii) Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various Blocks within the CHANDIGARH office compound. 1

Ans **Best wired medium: Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable**

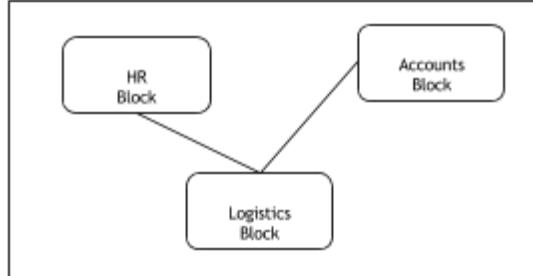


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**OR**

**CHANDIGARH Office**



**(½ Mark for writing best wired medium)  
(½ Mark for drawing the layout correctly)**

- |  |                                                                                                                                        |   |
|--|----------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <b>(iii)</b> Suggest a device/software and its placement that would provide data security for the entire network of CHANDIGARH office. | 1 |
|--|----------------------------------------------------------------------------------------------------------------------------------------|---|

**Ans Firewall - Placed with the server at the HR Block**

**OR**

**Any other valid device/software name**

**(½ Mark for writing device/software name correctly)  
(½ Mark for writing correct placement)**

- |  |                                                                                                             |   |
|--|-------------------------------------------------------------------------------------------------------------|---|
|  | <b>(iv)</b> Which of the following kind of network, would it be<br>(a) PAN<br>(b) WAN<br>(c) MAN<br>(d) LAN | 1 |
|--|-------------------------------------------------------------------------------------------------------------|---|

**Ans (b) WAN and (d) LAN**

**OR**

**(b) WAN**

**OR**

**(d) LAN**

**(1 Mark for writing any one of the correct option(s))**

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## General Instructions:

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

## SECTION A - (Only for candidates, who opted for C++)

|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|---|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a) | Write the type of C++ tokens (keywords and user defined identifiers) from the following:<br>(i) new<br>(ii) While<br>(iii) case<br>(iv) Num_2                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2 |
|   | Ans | (i) new - Keyword<br>(ii) While - User defined Identifier<br>(iii) case - Keyword<br>(iv) Num_2 - User defined Identifier                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|   |     | <i>(½ Mark for writing each correct keywords)</i><br><i>(½ Mark for writing each correct user defined identifiers)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|   | (b) | Anil typed the following C++ code and during compilation he found three errors as follows:<br>(i) Function strlen should have prototype<br>(ii) Undefined symbol cout<br>(iii) Undefined symbol endl<br><br>On asking, his teacher told him to include necessary header files in the code. Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code<br><pre>void main() {     char Txt[] = "Welcome";     for(int C= 0; C&lt;strlen(Txt); C++)         Txt[C] = Txt[C]+1;     cout&lt;&lt;Txt&lt;&lt;endl; }</pre> | 1 |

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|  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|--|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <b>Ans</b> | <b>string.h</b><br><b>iostream.h OR fstream.h OR iomanip.h</b>                                                                                                                                                                                                                                                                                                                                                                                            |   |
|  |            | <b>(½ Mark each for writing correct header files)</b>                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|  |            | <b>NOTE:</b><br><i>Ignore additional header file(s)</i>                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|  | (c)        | <p>Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre>void main() {     cout&lt;&lt;"Enter an Alphabet:" ;     cin&gt;&gt;CH;     switch(CH)          case 'A' cout&lt;&lt;"Ant";      Break;         case 'B' cout&lt;&lt;"Bear" ; Break; }</pre>                                               | 2 |
|  | <b>Ans</b> | <pre>void main() {     cout&lt;&lt;"Enter an Alphabet:" ;     <u>char</u> CH;                                // Error 1     cin&gt;&gt;CH;     switch(CH)     {         case 'A' <u>:</u>                         // Error 2(i)             cout&lt;&lt;"Ant"; <u>break</u>;           // Error 4(i)         case 'B' <u>:</u>                         // Error 3(ii)             cout&lt;&lt;"Bear"; <u>break</u>;          // Error 4(ii)     } }</pre> |   |
|  |            | <b>(½ Mark for correcting Error 1)</b><br><b>(½ Mark for correcting Error 2(i) and Error 2(ii))</b><br><b>(½ Mark for correcting Error 3(i) and Error 3(ii))</b><br><b>(½ Mark for correcting Error 4(i) and Error 4(ii))</b><br><b>OR</b><br><b>(1 Mark for identifying all the errors without corrections)</b>                                                                                                                                          |   |
|  | (d)        | <p>Find and write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already included in the program.</p> <pre>#define Diff(N1,N2) ((N1&gt;N2)?N1-N2:N2-N1) void main() {     int A,B,NUM[] = {10,23,14,54,32};     for(int CNT =4; CNT&gt;0; CNT--)     {</pre>                                                                                                                                             | 2 |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|--|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <pre> A=NUM[CNT] ; B=NUM[CNT-1] ; cout&lt;&lt;Diff(A,B)&lt;&lt;'#' ; } } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|  | Ans | 22#40#9#13#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|  |     | <p>(½ Mark for writing each correct value)<br/> <b>OR</b><br/>         (1 Mark to be awarded if the output written in reverse order as<br/>         13#9#40#22#)<br/> <i>Note: Deduct ½ Mark for not considering any/all # as separator and/or writing the values in different lines</i></p>                                                                                                                                                                                                                                                           |   |
|  | (e) | <p>Find and write the output of the following C++ program code:<br/>         Note: Assume all required header files are already being included in the program.</p> <pre> void main() {     int *Point, Score[]={100,95,150,75,65,120};     Point = Score;     for(int L = 0; L&lt;6; L++)     {         if((*Point)%10==0)             *Point /= 2;         else             *Point -= 2;         if((*Point)%5==0)             *Point /= 5;         Point++;     }     for(int L = 5; L&gt;=0; L--)         cout&lt;&lt;Score[L]&lt;&lt;"*"; } </pre> | 3 |
|  | Ans | 12*63*73*15*93*10*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|  |     | <p>(½ Mark for writing each correct value)</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Deduct ½ Mark for not considering any/all * as separator and or writing the values in different lines</li> <li>• Deduct ½ Mark if the output written in reverse order as<br/>         10*93*15*73*63*12*</li> <li>• Full 3 Marks to be awarded if “Multiple declaration/syntax error for L” is mentioned</li> </ul>                                                                                                                        |   |
|  | (f) | <p>Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables N and M.</p> <p><b>Note:</b></p>                                                                                                                                                                                                                                                                                                                             | 2 |

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- Assume all the required header files are already being included in the code.
- The function random(n) generates an integer between 0 and n-1

```
void main()
{
    randomize();
    int N=random(3), M=random(4);
    int DOCK[3][3] = {{1,2,3}, {2,3,4}, {3,4,5}};
    for(int R=0; R<N; R++)
    {
        for(int C=0; C<M; C++)
            cout<<DOCK[R][C]<<" ";
        cout<<endl;
    }
}
```

| (i)   | (ii)  |
|-------|-------|
| 1 2 3 | 1 2 3 |
| 2 3 4 | 2 3 4 |
| 3 4 5 |       |
| (iii) | (iv)  |
| 1 2   | 1 2   |
| 2 3   | 2 3   |
|       | 3 4   |

**Ans** Correct Options : (ii) and (iii)

Maximum value of N = 2

Maximum value M = 3

*(1 Mark for writing the correct options)*

*NOTE: No marks to be awarded for writing any other option or any other combination*

*(½ Mark for writing correct Maximum value of N)*

*(½ Mark for writing correct Maximum value of M)*

2. (a) Differentiate between protected and private members of a class in context of Object Oriented Programming. Also give a suitable example illustrating accessibility/non-accessibility of each using a class and an object in C++. 2

**Ans**

| private                                             | protected                                       |
|-----------------------------------------------------|-------------------------------------------------|
| Implicit Visibility Mode                            | Explicit Visibility Mode                        |
| Not accessible to member functions of derived class | Accessible to member functions of derived class |

Example:

```
class A
{
    int x;
```

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|  |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|--|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |      | <pre><b>protected:</b>     int Y; <b>public:</b>     void Z(); };</pre> <p><b>OR</b><br/>Any other correct example demonstrating difference between private and protected members of a class</p>                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|  |      | <p><i>(Full 2 Marks for any one correct difference between private and protected members in a class using a suitable code in C++)</i></p> <p><b>OR</b></p> <p><i>(1 Mark for writing any one correct difference between private and protected members in a class without any example)</i></p>                                                                                                                                                                                                                                                                                                                            |  |
|  | (b)  | <p>Observe the following C++ code and answer the questions (i) and (ii).<br/>Note: Assume all necessary files are included.</p> <pre>class TEST {     long TCode;     char TTitle[20];     float Score; public:     TEST()                                //Member Function 1     {         TCode=100; strcpy(TTitle,"FIRST Test"); Score=0;     }     TEST(TEST &amp;T)                         //Member Function 2     {         TCode=E.TCode+1;         strcpy(TTitle,T.TTitle);         Score=T.Score;     } }; void main() {</pre> <p style="text-align: right;"><i>//Statement 1</i><br/><i>//Statement 2</i></p> |  |
|  | (i)  | Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class TEST? 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|  | Ans  | <b>Polymorphism OR Constructor overloading OR Function Overloading</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
|  |      | <i>(1Mark for mentioning the correct concept name )</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|  | (ii) | Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively. 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|  | Ans  | <b>TEST T1;</b> //Statement 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |     | <pre>TEST T2(T1) ;           //Statement 2 OR TEST T2=T1;            //Statement 2</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  |     | <p><i>( ½ Mark for writing statement 1 correctly)<br/> ( ½ Mark for writing statement 2 correctly OR ½ Mark for mentioning E not declared)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  | (c) | <p>Write the definition of a class BOX in C++ with following description:</p> <p>Private Members</p> <pre>- BoxNumber    // data member of integer type - Side         // data member of float type - Area          // data member of float type - ExecArea()   // Member function to calculate and assign                // Area as Side * Side</pre> <p>Public Members</p> <pre>- GetBox() // A function to allow user to enter values of            // BoxNumber and Side. Also, this            // function should call ExecArea() to calculate            // Area - ShowBox() // A function to display BoxNumber, Side            // and Area</pre> | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|  | Ans | <pre>class BOX {     int BoxNumber ;     float Side ;     float Area ;     void ExecArea(){ Area=Side*Side; }  public:     void GetBox();     void ShowBox(); };  void BOX::GetBox() {     cin&gt;&gt;BoxNumber&gt;&gt;Side;     ExecArea(); }  void BOX::ShowBox() {     cout&lt;&lt;BoxNumber&lt;&lt;" "&lt;&lt;Side&lt;&lt;" "&lt;&lt;Area&lt;&lt;endl; }</pre>                                                                                                                                                                                                                                                                                       | <p><i>(½ Mark for declaring class header correctly)<br/> (½ Mark for declaring data members correctly)<br/> (1 Mark for defining ExecArea() correctly)<br/> (½ Mark for taking inputs of BoxNumber and Side in GetBox())<br/> (½ Mark for invoking ExecArea() inside GetBox())<br/> (½ Mark for defining ShowBox() correctly)<br/> (½ Mark for correctly closing class declaration with a semicolon ; )</i></p> <p><i>NOTE: Marks to be awarded for defining the member functions inside or outside the class</i></p> |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <p>(d) Answer the questions (i) to (iv) based on the following:</p> <pre> class First {     int X1; protected:     float X2; public:     First();     void Enter1(); void Display1(); };  class Second : private First {     int Y1; protected:     float Y2; public:     Second();     void Enter2();     void Display(); };  class Third : public Second {     int Z1; public:     Third();     void Enter3();     void Display(); };  void main() {     Third T;           //Statement 1     _____; //Statement 2 } </pre> | 4 |
|     | <p>(i) Which type of Inheritance out of the following is illustrated in the above example?<br/>Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance</p>                                                                                                                                                                                                                                                                                                                                                     |   |
| Ans | <b>Multilevel Inheritance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|     | <b>(1 Mark for writing correct option)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|     | <p>(ii) Write the names of all the member functions, which are directly accessible by the object T of class Third as declared in main() function.</p>                                                                                                                                                                                                                                                                                                                                                                         |   |
| Ans | <b>Enter2(), Display() of class Second<br/>Enter3(), Display() of class Third</b> <p>OR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |

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|    |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |    |    |    |    |    |    |    |    |    |    |    |   |
|----|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|---|
|    |       | <pre><b>Enter2()</b> <b>Second::Display()</b> <b>Enter3()</b> <b>Display() OR Third::Display()</b></pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    |       | <p><i>(1 Mark for writing all correct function names )</i></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Marks not to be awarded for partially correct answer</b></li> <li>• <b>Ignore the mention of Constructors</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    | (iii) | Write Statement 2 to call function Display() of class Second from the object T of class Third.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    | Ans   | <b>T.Second::Display();</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    |       | <i>(1 Mark for writing Statement 2 correctly)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    | (iv)  | What will be the order of execution of the constructors, when the object T of class Third is declared inside main()?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    | Ans   | First, Second, Third                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |    |    |    |    |    |    |    |    |    |    |    |   |
|    |       | <p><i>(1 Mark for writing correct order)</i></p> <ul style="list-style-type: none"> <li>• <b>No Marks to be awarded for any other combination/order.</b></li> <li>• <b>Names of the constructor/class without parenthesis is acceptable</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 3  | (a)   | <p>Write the definition of a function AddUp(int Arr[], int N) in C++, in which all even positions (i.e. 0,2,4,...) of the array should be added with the content of the element in the next position and odd positions (i.e. 1,3,5,...) elements should be incremented by 10.</p> <p>Example: if the array Arr contains</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>23</td><td>30</td><td>45</td><td>10</td><td>15</td><td>25</td></tr> </table> <p>Then the array should become</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>53</td><td>40</td><td>55</td><td>20</td><td>40</td><td>35</td></tr> </table> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• The function should only alter the content in the same array.</li> <li>• The function should not copy the altered content in another array.</li> <li>• The function should not display the altered content of the array.</li> <li>• Assuming, the Number of elements in the array are Even.</li> </ul> | 23 | 30 | 45 | 10 | 15 | 25 | 53 | 40 | 55 | 20 | 40 | 35 | 3 |
| 23 | 30    | 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10 | 15 | 25 |    |    |    |    |    |    |    |    |    |   |
| 53 | 40    | 55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20 | 40 | 35 |    |    |    |    |    |    |    |    |    |   |
|    | Ans   | <pre>void AddUp(int Arr[], int N) {     for(int i=0; i&lt;N; i++)     {         if(i%2==0)             Arr[i]=Arr[i]+Arr[i+1];         else             Arr[i]=Arr[i]+10;     } }</pre> <p>OR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |    |    |    |    |    |    |    |    |    |   |

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|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   |     | Any other correct C++ code for the required function definition.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |     | <p><b>(1 Mark for correctly writing the loop)</b><br/> <b>(1 Mark for correctly checking condition for even/odd locations)</b><br/> <b>(½ Mark for adding the element in the next position to the even positioned elements)</b><br/> <b>(½ Mark for incrementing the element by 10 for odd positioned elements)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   | (b) | <p>Write a definition for a function SUMMIDCOL(int MATRIX[][][10],int N,int M) in C++, which finds the sum of the middle column's elements of the MATRIX (Assuming N represents number of rows and M represents number of columns, which is an odd integer).</p> <p>Example: if the content of array MATRIX having N as 5 and M as 3 is as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1</td><td>2</td><td>1</td></tr> <tr> <td>2</td><td>1</td><td>4</td></tr> <tr> <td>3</td><td>4</td><td>5</td></tr> <tr> <td>4</td><td>5</td><td>3</td></tr> <tr> <td>5</td><td>3</td><td>2</td></tr> </table> <p>The function should calculate the sum and display the following:<br/> Sum of Middle Column: 15</p> | 1 | 2 | 1 | 2 | 1 | 4 | 3 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 2 | 2 |
| 1 | 2   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 | 1   | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 | 4   | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4 | 5   | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5 | 3   | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   | Ans | <pre>void SUMMIDCOL(int MATRIX[][][10],int N,int M) {     int mid=M/2;     int sum=0;     for(int i=0; i&lt;N; i++)     {         sum=sum+MATRIX[i][mid];     }     cout&lt;&lt;" Sum of Middle Column"&lt;&lt;sum; }</pre> <p>OR</p> <p>Any other correct C++ code for the required function definition</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |     | <p><b>(½ Mark for correctly writing the loop)</b><br/> <b>(1 Mark for adding middle column elements)</b><br/> <b>(½ Mark for displaying the sum of middle column elements)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   | (c) | ARR[15][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[5][15], if the element ARR[10][5] is stored at the memory location 35000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   | Ans | <pre>ROW MAJOR: Loc(ARR[I][J]) = BaseAddress + W [( I - LBR)*C + (J - LBC)]</pre> <p>(where W=size of each element = 4 bytes, R=Number of Rows=15, C=Number of Columns=20 )</p> <p>Assuming LBR = LBC = 0</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre> LOC (ARR[10][5]) 35000      = BaseAddress + W(I*C + J) 35000      = BaseAddress + 4(10*20 + 5) 35000      = BaseAddress + 4(205) 35000      = BaseAddress + 820 BaseAddress = 35000 - 820             = 34180  LOC (ARR[5][15])= BaseAddress + W(I*C + J)                 = 34180      + 4(5*20 + 15)                 = 34180      + 4(100 + 15)                 = 34180      + 4 x 115                 = 34180      + 460                 = 34640  OR  Loc (ARR[I][J]) = Ref. Address + W (( I - LR)*C + (J - LC)) (where W=size of each element = 4 bytes, R=Number of Rows =15, C=Number of Columns=20 Reference Address= Address of given cell ARR[10][5]=35000 LR = Row value of given cell = 10 LC = Column value of given cell = 5  LOC (ARR[5][15]) = LOC(ARR[10][5]) + 4((5-10)*20 + (15-5)) LOC (ARR[5][15]) = 35000 + 4(-100 + 10)                   = 35000 + 4[-90]                   = 35000 -360                   = 34640 </pre> |   |
| (d) | <p><i>(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)</i><br/> <i>(1Mark for correct calculation)</i><br/> <i>(1 Mark for final correct address)</i></p> <p>Write the definition of a member function PUSHGIFT() for a class STACK in C++, to add a GIFT in a dynamically allocated stack of GIFTS considering the following code is already written as a part of the program:</p> <pre> struct GIFT {     int GCODE;           //Gift Code     char GDESC[20];     //Gift Description     GIFT *Link; };  class STACK { public:     Gift *TOP;     STACK(){TOP=NULL;}     void PUSHGIFT();     void POPGIFT();     ~STACK(); }; </pre>                                                                                                                                                                                                                                                               | 4 |

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|                | <b>ANS</b>   | <pre> <b>void STACK::PUSHGIFT()</b> {     GIFT *T = new GIFT;     cin&gt;&gt;T-&gt;GCODE;     gets(T-&gt;GDESC);     T-&gt;Link = TOP;     TOP = T; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
|----------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|----------------|---|--|---|---|---|---|---|----|---|---|----|----|---|-----|----|---|-----|-----|---|---|------|---|----|------|---|----|-------|---|----|--------|---|----|---------|--|--|-----------|--|
|                |              | <p>(1 Mark for creating a new Node)<br/>         (1 Mark for fetching values of GCODE and GDESC)<br/>         (1 Mark for assigning TOP to the Link of the new Node)<br/>         (1 Mark for assigning TOP to the new Node)</p> <p><b>NOTE:</b><br/> <i>GIFT/Gift - Both acceptable</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
|                | (e)          | <p>Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion:</p> <p><b>X - ( Y + Z ) / U * V</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2              |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
|                | <b>Ans</b>   | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;"><b>ELEMENT</b></th><th style="text-align: left; padding: 2px;"><b>Stack</b></th><th style="text-align: left; padding: 2px;"><b>POSTFIX</b></th></tr> </thead> <tbody> <tr><td style="padding: 2px;">X</td><td style="padding: 2px;"></td><td style="padding: 2px;">X</td></tr> <tr><td style="padding: 2px;">-</td><td style="padding: 2px;">-</td><td style="padding: 2px;">X</td></tr> <tr><td style="padding: 2px;">(</td><td style="padding: 2px;">-(</td><td style="padding: 2px;">X</td></tr> <tr><td style="padding: 2px;">Y</td><td style="padding: 2px;">-(</td><td style="padding: 2px;">XY</td></tr> <tr><td style="padding: 2px;">+</td><td style="padding: 2px;">-(+</td><td style="padding: 2px;">XY</td></tr> <tr><td style="padding: 2px;">Z</td><td style="padding: 2px;">-(+</td><td style="padding: 2px;">XYZ</td></tr> <tr><td style="padding: 2px;">)</td><td style="padding: 2px;">-</td><td style="padding: 2px;">XYZ+</td></tr> <tr><td style="padding: 2px;">/</td><td style="padding: 2px;">-/</td><td style="padding: 2px;">XYZ+</td></tr> <tr><td style="padding: 2px;">U</td><td style="padding: 2px;">-/</td><td style="padding: 2px;">XYZ+U</td></tr> <tr><td style="padding: 2px;">*</td><td style="padding: 2px;">-*</td><td style="padding: 2px;">XYZ+U/</td></tr> <tr><td style="padding: 2px;">V</td><td style="padding: 2px;">-*</td><td style="padding: 2px;">XYZ+U/V</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;"></td><td style="padding: 2px;">XYZ+U/V*-</td></tr> </tbody> </table> | <b>ELEMENT</b> | <b>Stack</b> | <b>POSTFIX</b> | X |  | X | - | - | X | ( | -( | X | Y | -( | XY | + | -(+ | XY | Z | -(+ | XYZ | ) | - | XYZ+ | / | -/ | XYZ+ | U | -/ | XYZ+U | * | -* | XYZ+U/ | V | -* | XYZ+U/V |  |  | XYZ+U/V*- |  |
| <b>ELEMENT</b> | <b>Stack</b> | <b>POSTFIX</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| X              |              | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| -              | -            | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| (              | -(           | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| Y              | -(           | XY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| +              | -(+          | XY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| Z              | -(+          | XYZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| )              | -            | XYZ+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| /              | -/           | XYZ+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| U              | -/           | XYZ+U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| *              | -*           | XYZ+U/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
| V              | -*           | XYZ+U/V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |
|                |              | XYZ+U/V*-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |                |   |  |   |   |   |   |   |    |   |   |    |    |   |     |    |   |     |     |   |   |      |   |    |      |   |    |       |   |    |        |   |    |         |  |  |           |  |

OR

$$X - (Y + Z) / U * V = (X - ((Y + Z) / U) * V)$$

| <b>ELEMENT</b> | <b>Stack</b> | <b>POSTFIX</b> |
|----------------|--------------|----------------|
| (              |              |                |
| X              |              | X              |
| -              | -            |                |
| (              | -            |                |
| (              | -            |                |
| Y              | -            | XY             |
| +              | - +          |                |
| Z              | -            | XYZ            |
| )              | -            | XYZ+           |
| /              | -/           |                |
| U              | -/           | XYZ+U          |

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|   |    |                  |
|---|----|------------------|
| ) | -  | <b>XYZ+U/</b>    |
| * | -* |                  |
| V |    | <b>XYZ+U/V</b>   |
| ) |    | <b>XYZ+U/V*</b>  |
| ) |    | <b>XYZ+U/V*-</b> |

**Postfix= XYZ+U/V\*-**

**OR**

Any other method for converting the given **infix** expression to its equivalent **postfix** expression showing stack contents.

**(½ Mark for correctly converting till each operator)**

**OR**

**(1 Mark to be given for writing correct answer without showing the stack content on each step)**

|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 4. | (a) | <p>Polina Raj has used a text editing software to type some text in an article. After saving the article as <b>MYNOTES.TXT</b>, she realised that she has wrongly typed alphabet K in place of alphabet C everywhere in the article.</p> <p>Write a function definition for <b>PURETEXT()</b> in C++ that would display the corrected version of the entire article of the file <b>MYNOTES.TXT</b> with all the alphabets “K” to be displayed as an alphabet “C” on screen.</p> <p>Note: Assuming that <b>MYNOTES.TXT</b> does not contain any C alphabet otherwise.</p> <p>Example:</p> <p>If Polina has stored the following content in the file <b>MYNOTES.TXT</b>:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> I OWN A KUTE LITTLE KAR.<br/> I KARE FOR IT AS MY KHILD. </div> <p>The function <b>PURETEXT()</b> should display the following content:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> I OWN A CUTE LITTLE CAR.<br/> I CARE FOR IT AS MY CHILD. </div> | 3 |
|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

|     |                                                                                                                                                                                                                                                                                                            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ans | <pre>void PURETEXT() {     char ch;     ifstream F("MYNOTES.TXT" );     while(F.get(ch))     {         if(ch=='K')             ch='C';         cout&lt;&lt;ch;     }     F.close(); //IGNORE }</pre> <p>OR</p> <pre>fstream F; F.open("MYNOTES.TXT", ios::in); OR fstream F("MYNOTES.TXT", ios::in);</pre> |
|     | <p><b>(1 Mark for opening MYNOTES.TXT correctly)</b></p> <p><b>(1 Mark for reading each character (using any method) from the file)</b></p> <p><b>(1 Mark for displaying ‘C’ in place of ‘K’)</b></p>                                                                                                      |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | (b) Write a definition for function COUNTPICTS ( ) in C++ to read each object of a binary file PHOTOS.DAT, find and display the total number of PHOTOS of type PORTRAIT. Assume that the file PHOTOS.DAT is created with the help of objects of class PHOTOS, which is defined below:<br><pre>class PHOTOS {     int PCODE;     char PTTYPE[20];//Photo Type as "PORTRAIT","NATURE" public:     void ENTER()     {         cin&gt;&gt;PCODE;gets(PTTYPE);     }     void SHOWCASE()     {         cout&lt;&lt;PCODE&lt;&lt;" : "&lt;&lt;PTTYPE&lt;&lt;endl;     }     char *GETPTYPE(){return PTYPE;} };</pre> | 2 |
| Ans | <pre>void COUNTPICTS() {     ifstream F;     F.open("PHOTOS.DAT",            ios::binary);     int count=0;     PHOTOS obj;     while(F.read((char*)&amp;obj,                  sizeof(obj)))     {         if(strcmp(obj.GETPTYPE(),"PORTRAIT")==0)             count++;     }     cout&lt;&lt;"Number of PORTRAIT photos :"&lt;&lt;count;     F.close(); //IGNORE }</pre> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <b>OR</b><br/> <pre>fstream F; F.open("PHOTOS.DAT",        ios::binary ios::in);</pre> </div> <p>Any other correct function definition</p>                   |   |
|     | <p>(½ Mark for opening PHOTOS.DAT correctly)<br/> (½ Mark for reading records from PHOTOS.DAT)<br/> (½ Mark for comparing PHOTOS of type PORTRAIT(ignore case sensitive checking) with strcmp or strcmpl)<br/> (½ Mark for displaying counter for matching records)</p>                                                                                                                                                                                                                                                                                                                                        |   |
| (c) | Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with a data of 200 clients.<br><pre>class CLIENTS {     int CCode;char CName[20]; public:</pre>                                                                                                                                                                                                                                                                                                                                                                                                 | 1 |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|--|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |     | <pre> void REGISTER();void DISPLAY(); };  void main() {     fstream File;     File.open("CLIENTS.DAT",ios::binary ios::in);     CLIENTS C;     File.seekg(6*sizeof(C));     File.read((char*)&amp;C, sizeof(C));     cout&lt;&lt;"Client Number:"&lt;&lt;File.tellg()/sizeof(C) + 1;     File.seekg(0,ios::end);     cout&lt;&lt;" of "&lt;&lt;File.tellg()/sizeof(C)&lt;&lt;endl;     File.close(); } </pre> |  |
|  | Ans | Client Number 8 of 200                                                                                                                                                                                                                                                                                                                                                                                        |  |
|  |     | <i>(½ Mark for displaying correct value of File.tellg()/sizeof(C) + 1)</i><br><i>(½ Mark for displaying correct value of File.tellg()/sizeof(C))</i>                                                                                                                                                                                                                                                          |  |

## SECTION B - [Only for candidates, who opted for Python]

|   |     |                                                                                                                                                                                                                       |   |
|---|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a) | Which of the following can be used as valid variable identifier(s) in Python?<br>(i) 4thSum<br>(ii) Total<br>(iii) Number#<br>(iv) _Data                                                                              | 2 |
|   | Ans | ii) Total                          iv) _Data<br><br><i>(1 mark for each correct option)</i><br><b>NOTE:</b><br><i>Deduct ½ Mark for each wrong name written</i>                                                       |   |
|   | (b) | Name the Python Library modules which need to be imported to invoke the following functions<br>(i) floor()<br>(ii) randint()                                                                                          | 1 |
|   | Ans | math<br>random<br><br><i>(½ Mark for writing each correct Library modules)</i><br><b>NOTE:</b><br><i>Ignore any other Library modules, if mentioned.</i>                                                              |   |
|   | (c) | Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.<br><pre> STRING=""WELCOME NOTE""" for S in range[0,8]:     print STRING(S) print S+STRING </pre> | 2 |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <p><b>Ans</b></p> <pre> <b>STRING="WELCOME"</b> <b>NOTE=""</b> <b>for S in range(0,8):</b>     <b>    print STRING[S]</b> <b>print S,STRING</b>  Also range(0,8) will give a runtime error as the index is out of range. It should be range(0,7)  <i>(½ Mark for each for any four corrections)</i> <b>OR</b> <i>(1 mark for identifying the errors, without suggesting corrections)</i> </pre>                                                                                                                                                                                                                                                                                            |   |
| (d) | <p>Find and write the output of the following python code:</p> <pre> <b>TXT = ["20", "50", "30", "40"]</b> <b>CNT = 3</b> <b>TOTAL = 0</b> <b>for C in [7,5,4,6]:</b>     <b>T = TXT[CNT]</b>     <b>TOTAL = float (T) + C</b>     <b>print TOTAL</b>     <b>CNT-=1</b> </pre>                                                                                                                                                                                                                                                                                                                                                                                                             | 2 |
|     | <p><b>Ans</b></p> <p>47.0<br/>35.0<br/>54.0<br/>26.0</p> <p><i>( ½ mark for each correct line of output)</i></p> <p><b>NOTE:</b></p> <p><i>Deduct ½ Mark for writing the answer in same line</i></p> <p><i>Deduct ½ Mark for writing numbers without decimal point</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
| (e) | <p>Find and write the output of the following python code:</p> <pre> <b>class INVENTORY:</b>     <b>def __init__(self,C=101,N="Pad",Q=100): #constructor</b>         <b>self.Code=C</b>         <b>self.IName=N</b>         <b>self.Qty=int(Q);</b>     <b>def Procure(self,Q):</b>         <b>self.Qty = self.Qty + Q</b>     <b>def Issue(self,Q):</b>         <b>self.Qty -= Q</b>     <b>def Status(self):</b>         <b>print self.Code,":",self.IName,"#",self.Qty</b> <b>I1=INVENTORY()</b> <b>I2=INVENTORY(105,"Thumb Pin",50)</b> <b>I3=INVENTORY(102,"U Clip")</b> <b>I1.Procure(25)</b> <b>I2.Issue(15)</b> <b>I3.Procure(50)</b> <b>I1.Status()</b> <b>I3.Status()</b> </pre> | 3 |

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|               |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                     |            |                     |   |
|---------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------|------------|---------------------|---|
|               |                     | <b>I2.Status()</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                     |            |                     |   |
|               | <b>Ans</b>          | <p><b>Output</b></p> <pre>101 : Pad # 125 102 : U Clip # 150 105 : Thumb Pin # 35</pre> <p><i>( 1 mark for each correct line of output)</i></p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>● Deduct ½ Mark for not writing any or all ‘:’ / ‘#’ symbol(s)</li> <li>● Deduct ½ Mark for not considering any or all line breaks at proper place(s)</li> </ul>                                                                                                                                                                                                                                                 |               |                     |            |                     |   |
|               | (f)                 | <p>What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable N.</p> <pre>import random NAV = ["LEFT", "FRONT", "RIGHT", "BACK"] ; NUM = random.randint(1,3) NAVG = "" for C in range(NUM,1,-1):     NAVG = NAVG+NAV[I] print NAVG</pre> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">(i) BACKRIGHT</td> <td style="padding: 5px;">(ii) BACKRIGHTFRONT</td> </tr> <tr> <td style="padding: 5px;">(iii) BACK</td> <td style="padding: 5px;">(iv) LEFTFRONTRIGHT</td> </tr> </table> | (i) BACKRIGHT | (ii) BACKRIGHTFRONT | (iii) BACK | (iv) LEFTFRONTRIGHT | 2 |
| (i) BACKRIGHT | (ii) BACKRIGHTFRONT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                     |            |                     |   |
| (iii) BACK    | (iv) LEFTFRONTRIGHT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                     |            |                     |   |
|               | <b>Ans</b>          | <p>(i) BACKRIGHT<br/>Max value 3 and minimum value 1 for variable NUM<br/>OR<br/>I or N not defined<br/>OR<br/>; wrongly placed in line 2</p> <p><i>(1 mark for mentioning the first option)</i></p> <p><b>NOTE: No marks to be awarded for writing any other option or any other combination</b></p> <p><i>(½ mark each for max and min values of NUM)</i><br/><b>OR</b><br/><b>(Full 2 Marks for mentioning the specific error(s))</b></p>                                                                                                                                                                                |               |                     |            |                     |   |
| 2             | (a)                 | List four characteristics of Object Oriented programming.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2             |                     |            |                     |   |
|               | <b>Ans</b>          | <ul style="list-style-type: none"> <li>● Encapsulation</li> <li>● Data Hiding</li> <li>● Abstraction</li> <li>● Inheritance</li> <li>● Polymorphism</li> </ul> <p><i>(½ mark for naming each characteristic - upto 4 characteristics)</i></p>                                                                                                                                                                                                                                                                                                                                                                               |               |                     |            |                     |   |
|               | (b)                 | <b>class Exam:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2             |                     |            |                     |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre> Regno=1 Marks=75 def __init__(self,r,m):     self.Regno=r     self.Marks=m def Assign(self,r,m):     Regno = r     Marks = m def Check(self):     print self.Regno, self.Marks print Regno, Marks </pre> <p>(i) In the above class definition, both the functions - function 1 as well as function 2 have similar definition. How are they different in execution?<br/> (ii) Write statements to execute function 1 and function 2.</p>                                                                                                                                                                                                                                                                  |   |
| Ans | <p>(i) Function 1 is the constructor which gets executed automatically as soon as the object of the class is created. Function 2 is a member function which has to be called to assign the values to Regno and Marks.</p> <p>(ii) Function 1    E1=Exam(1,95) # Any values in the parameter<br/> Function 2    E1.Assign(1,95) # Any values in the parameter</p> <p><i>(1 mark for correct difference)</i><br/> <i>( ½ mark for each statement for executing Function 1 and Function 2 )</i></p>                                                                                                                                                                                                               |   |
| (c) | <p>Define a class BOX in Python with following specifications</p> <p><b>Instance Attributes</b></p> <ul style="list-style-type: none"> <li>- BoxID # Numeric value with a default value 101</li> <li>- Side # Numeric value with a default value 10</li> <li>- Area # Numeric value with a default value 0</li> </ul> <p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>- ExecArea() # Method to calculate Area as<br/> # Side * Side</li> <li>- NewBox() # Method to allow user to enter values of<br/> # BoxID and Side. It should also<br/> # Call ExecArea Method</li> <li>- ViewBox() # Method to display all the Attributes</li> </ul>                                                       | 4 |
| Ans | <pre> class BOX: # can also be given as class BOX( ):     # or class BOX(Object):         def __init__(self):             self.BoxID=101             self.Side=10             self.Area=0         def ExecArea(self):             self.Area=self.Side*self.Side         def NewBox(self):             self.BoxID=input("Enter BoxID")             self.Side=input("Enter side")             self.ExecArea()          # OR ExecArea(self)         def ViewBox(self): </pre> <div style="border: 1px solid black; padding: 5px; margin-left: 20px;"> <pre> def __init__(self,B,S,A):     #Any variable instead of B, S, A may be used         self.BoxID=B         self.Side=S         self.Area=A </pre> </div> |   |

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|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|    |     | <pre> print self.BoxID print self.Side print self.Area </pre> <p><i>(1/2 Mark for correct syntax for class header)</i><br/> <i>(1/2 Mark for correct declaration of instance attributes)</i><br/> <i>(1 Mark for correct definition of ExecArea( ) method)</i><br/> <i>(1 Mark for correct definition of NewBox( ) with proper invocation of ExecArea( ))</i><br/> <i>(1 Mark for correct definition of ViewBox( ))</i><br/> <b>NOTE:</b><br/> <i>Deduct 1/2 Mark if ExecArea( ) is not invoked properly inside NewBox( ) method</i></p>             |   |
|    | (d) | Differentiate between static and dynamic binding in Python? Give suitable examples of each.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 |
|    | Ans | <p>Static Binding: It allows linking of function call to the function definition during compilation of the program.</p> <p>Dynamic Binding: It allows linking of a function during run time. That means the code of the function that is to be linked with function call is unknown until it is executed. Dynamic binding of functions makes the programs more flexible.</p> <p><i>(1 mark for each correct explanation of static and dynamic binding)</i><br/> <b>OR</b><br/> <i>(1 for each correct example of static and dynamic binding)</i></p> |   |
|    | (e) | <p>Write two methods in python using concept of Function Overloading (Polymorphism) to perform the following operations:</p> <p>(i) A function having one argument as Radius, to calculate Area of Circle as <b>3.14#Radius#Radius</b></p> <p>(ii) A function having two arguments as Base and Height, to calculate Area of right angled triangle as <b>0.5#Base#Height</b>.</p>                                                                                                                                                                     | 2 |
|    | Ans | <pre> def Area(R) :     print 3.14*R*R def Area(B,H) :     print 0.5*B*H </pre> <p><i>Note: Python does not support function overloading “as illustrated in the example shown above”. If you run the code, the second Area(B,H) definition will override the first one.</i></p> <p><i>(1 mark for each function definition)</i><br/> <b>OR</b><br/> <i>(Full 2 Marks for mentioning Python does not support function overloading)</i></p>                                                                                                            |   |
| 3. | (a) | <p>What will be the status of the following list after the First, Second and Third pass of the bubble sort method used for arranging the following elements in ascending order?</p> <p>Note: Show the status of all the elements after each pass very clearly underlining the changes.</p> <p><b>52, 42, -10, 60, 90, 20</b></p>                                                                                                                                                                                                                     | 3 |
|    | Ans | I Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |

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|    |     |     |    |    |    |
|----|-----|-----|----|----|----|
| 52 | 42  | -10 | 60 | 90 | 20 |
| 42 | 52  | -10 | 60 | 90 | 20 |
| 42 | -10 | 52  | 60 | 90 | 20 |
| 42 | -10 | 52  | 60 | 90 | 20 |
| 42 | -10 | 52  | 60 | 90 | 20 |
| 42 | -10 | 52  | 60 | 20 | 90 |

II Pass

|     |     |    |    |    |    |
|-----|-----|----|----|----|----|
| 42  | -10 | 52 | 60 | 20 | 90 |
| -10 | 42  | 52 | 60 | 20 | 90 |
| -10 | 42  | 52 | 60 | 20 | 90 |
| -10 | 42  | 52 | 60 | 20 | 90 |
| -10 | 42  | 52 | 20 | 60 | 90 |

III Pass

|     |    |    |    |    |    |
|-----|----|----|----|----|----|
| -10 | 42 | 52 | 20 | 60 | 90 |
| -10 | 42 | 52 | 20 | 60 | 90 |
| -10 | 42 | 52 | 20 | 60 | 90 |
| -10 | 42 | 20 | 52 | 60 | 90 |

*(1 mark for last set of values of each correct pass)*

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (b) | Write definition of a method <b>EvenSum(NUMBERS)</b> to add those values in the list of NUMBERS, which are odd.                                                                                                                                                                                                                                                                                                                                                  | 3 |
| Ans | <pre>def EvenSum(NUMBERS) :     n=len(NUMBERS)     s=0     for i in range(n) :         if (i%2!=0) :             s=s+NUMBERS[i]     print(s)  <i>(½ mark for finding length of the list)</i> <i>( ½ mark for initializing s (sum) with 0)</i> <i>( ½ mark for reading each element of the list using a loop)</i> <i>( ½ mark for checking odd location)</i> <i>( ½ mark for adding it to the sum)</i> <i>( ½ mark for printing or returning the value)</i></pre> |   |
| (c) | Write Addnew(Member) and Remove(Member) methods in python to Add a new Member and Remove a Member from a List of Members, considering them to act as INSERT and DELETE operations of the data structure Queue.                                                                                                                                                                                                                                                   | 4 |
| Ans | <pre>class queue:     Member=[]     def Addnew(self) :         a=input("enter member name: ")         queue.Member.append(a)     def Remove(self) :         if (queue.Member==[]) :             print "Queue empty"         else:             print "deleted element is: ",queue.Member[0]</pre>                                                                                                                                                                 |   |

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|         |                | <pre><code>del queue.Member[0] # queue.Member.delete()  ( ½ mark for Addnew header) ( ½ mark for accepting a value from user) ( ½ mark for adding value in list) ( ½ mark for Remove header) ( ½ mark for checking empty list condition) ( ½ mark for displaying removed Member) ( ½ mark for displaying the value to be deleted) ( ½ mark for deleting value from list)</code></pre> <p><b>NOTE:</b><br/> <i>Marks not to be deducted for methods written without using a class</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
|---------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------|---|---|---|-------|---|---|----|--------|---|------------|---|----------------|---|-------------|---|-------|---|---|--|
|         | (d)            | <p>Write definition of a Method MSEARCH(STATES) to display all the state names from a list of STATES, which are starting with alphabet M.</p> <p>For example:</p> <p>If the list STATES contains</p> <pre><code>[ "MP" , "UP" , "WB" , "TN" , "MH" , "MZ" , "DL" , "BH" , "RJ" , "HR" ]</code></pre> <p>The following should get displayed</p> <pre><code>MP MH MZ</code></pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2       |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
|         | Ans            | <pre><code>def MSEARCH(STATES):     for i in STATES:         if i[0]=='M':             print i</code></pre> <p>( ½ mark method header)<br/> ( ½ mark for loop)<br/> ( ½ mark for checking condition of first letter M)<br/> ( ½ mark for displaying value)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
|         | (e)            | <p>Evaluate the following Postfix notation of expression:</p> <p>4 , 2 , * , 22 , 5 , 6 , + , / , -</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2       |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
|         | Ans            | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 2px;">Element</th> <th style="text-align: center; padding: 2px;">Stack Contents</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">4</td> <td style="text-align: center; padding: 2px;">4</td> </tr> <tr> <td style="text-align: center; padding: 2px;">2</td> <td style="text-align: center; padding: 2px;">4 , 2</td> </tr> <tr> <td style="text-align: center; padding: 2px;">*</td> <td style="text-align: center; padding: 2px;">8</td> </tr> <tr> <td style="text-align: center; padding: 2px;">22</td> <td style="text-align: center; padding: 2px;">8 , 22</td> </tr> <tr> <td style="text-align: center; padding: 2px;">5</td> <td style="text-align: center; padding: 2px;">8 , 22 , 5</td> </tr> <tr> <td style="text-align: center; padding: 2px;">6</td> <td style="text-align: center; padding: 2px;">8 , 22 , 5 , 6</td> </tr> <tr> <td style="text-align: center; padding: 2px;">+</td> <td style="text-align: center; padding: 2px;">8 , 22 , 11</td> </tr> <tr> <td style="text-align: center; padding: 2px;">/</td> <td style="text-align: center; padding: 2px;">8 , 2</td> </tr> <tr> <td style="text-align: center; padding: 2px;">-</td> <td style="text-align: center; padding: 2px;">6</td> </tr> </tbody> </table> <p>Answer: 6</p> <p>(½ Mark for evaluation till each operator)<br/> OR<br/> (1 Mark for only writing the Final answer without showing stack status)</p> | Element | Stack Contents | 4 | 4 | 2 | 4 , 2 | * | 8 | 22 | 8 , 22 | 5 | 8 , 22 , 5 | 6 | 8 , 22 , 5 , 6 | + | 8 , 22 , 11 | / | 8 , 2 | - | 6 |  |
| Element | Stack Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| 4       | 4              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| 2       | 4 , 2          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| *       | 8              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| 22      | 8 , 22         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| 5       | 8 , 22 , 5     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| 6       | 8 , 22 , 5 , 6 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| +       | 8 , 22 , 11    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| /       | 8 , 2          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |
| -       | 6              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                |   |   |   |       |   |   |    |        |   |            |   |                |   |             |   |       |   |   |  |

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|   |     |                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|---|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 4 | (a) | Differentiate between file modes <b>r+</b> and <b>rb+</b> with respect to Python.                                                                                                                                                                                                                                                                                                                                     | 1 |
|   | Ans | <p><b>r+</b> Opens a file for both reading and writing. The file pointer placed at the beginning of the file.</p> <p><b>rb+</b> Opens a file for both reading and writing in binary format. The file pointer placed at the beginning of the file.</p> <p><i>(1 mark for correct difference )</i></p> <p><b>OR</b></p> <p><i>(½ Mark for each correct use of r+ and rb+)</i></p>                                       |   |
|   | (b) | Write a method in python to read lines from a text file MYNOTES.TXT, and display those lines, which are starting with an alphabet 'K'.                                                                                                                                                                                                                                                                                | 2 |
|   | Ans | <pre>def display():     file=open('MYNOTES.TXT','r')     line=file.readline()     while line:         if line[0]=='K' :             print line         line=file.readline()     file.close() #IGNORE</pre> <p><i>(½ Mark for opening the file)</i></p> <p><i>(½ Mark for reading all lines)</i></p> <p><i>(½ Mark for checking condition for line starting with K)</i></p> <p><i>(½ Mark for displaying line)</i></p> |   |
|   | (c) | Considering the following definition of class FACTORY, write a method in Python to search and display the content in a pickled file FACTORY.DAT, where FCTID is matching with the value '105'.                                                                                                                                                                                                                        | 3 |
|   |     | <pre>class Factory:     def __init__(self,FID,FNAM):         self.FCTID = FID      # FCTID  Factory ID         self.FCTNM = FNAM     # FCTNM  Factory Name         self.PROD = 1000       # PROD   Production     def Display(self):         print self.FCTID,":",self.FCTNM,":",self.PROD</pre>                                                                                                                      |   |
|   | Ans | <pre>import pickle def ques4c( ):     f=Factory( )     file=open('FACTORY.DAT','rb')     try:         while True:             f=pickle.load(file)             if f.FCTID==105:                 f.Display()     except EOF Error:         pass     file.close() #IGNORE</pre> <p><i>(½ Mark for correct method header)</i></p> <p><i>(½ Mark for opening the file FACTORY.DAT correctly)</i></p>                       |   |

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**(½ Mark for correct loop)**  
**(½ Mark for correct load( ))**  
**(½ Mark for correct checking of FCTID)**  
**(½ Mark for displaying the record)**

## SECTION C - (For all the candidates)

|       |                   | <p><b>5 (a)</b> Observe the following table MEMBER carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in RESULT. Also, find the Degree and Cardinality of the RESULT.</p> <p style="text-align: center;"><b>MEMBER</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">NO</th><th style="width: 40%;">MNAME</th><th style="width: 45%;">STREAM</th></tr> </thead> <tbody> <tr> <td>M001</td><td>JAYA</td><td>SCIENCE</td></tr> <tr> <td>M002</td><td>ADITYA</td><td>HUMANITIES</td></tr> <tr> <td>M003</td><td>HANSRAJ</td><td>SCIENCE</td></tr> <tr> <td>M004</td><td>SHIVAK</td><td>COMMERCE</td></tr> </tbody> </table> <p style="text-align: center;"><b>RESULT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">NO</th><th style="width: 40%;">MNAME</th><th style="width: 45%;">STREAM</th></tr> </thead> <tbody> <tr> <td>M002</td><td>ADITYA</td><td>HUMANITIES</td></tr> </tbody> </table>                                                                                                                   | NO         | MNAME  | STREAM | M001 | JAYA         | SCIENCE | M002 | ADITYA  | HUMANITIES | M003 | HANSRAJ     | SCIENCE   | M004 | SHIVAK            | COMMERCE | NO   | MNAME         | STREAM | M002 | ADITYA | HUMANITIES | 2         |     |            |      |            |     |             |      |            |     |            |      |            |   |
|-------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------|--------|------|--------------|---------|------|---------|------------|------|-------------|-----------|------|-------------------|----------|------|---------------|--------|------|--------|------------|-----------|-----|------------|------|------------|-----|-------------|------|------------|-----|------------|------|------------|---|
| NO    | MNAME             | STREAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| M001  | JAYA              | SCIENCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| M002  | ADITYA            | HUMANITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| M003  | HANSRAJ           | SCIENCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| M004  | SHIVAK            | COMMERCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| NO    | MNAME             | STREAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| M002  | ADITYA            | HUMANITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
|       |                   | <p><b>Ans</b> (i) SELECTION</p> <p>Degree=3<br/>Cardinality=1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
|       |                   | <p><b>(1 Mark for writing the correct name of RDBMS operation)</b><br/> <b>(½ Mark for writing correct degree)</b><br/> <b>(½ Mark for writing correct cardinality)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
|       |                   | <p><b>(b)</b> Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables</p> <p style="text-align: center;"><b>DVD</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">DCODE</th><th style="width: 40%;">DTITLE</th><th style="width: 35%;">DTYPE</th></tr> </thead> <tbody> <tr> <td>F101</td><td>Henry Martin</td><td>Folk</td></tr> <tr> <td>C102</td><td>Dhrupad</td><td>Classical</td></tr> <tr> <td>C101</td><td>The Planets</td><td>Classical</td></tr> <tr> <td>F102</td><td>Universal Soldier</td><td>Folk</td></tr> <tr> <td>R102</td><td>A day in life</td><td>Rock</td></tr> </tbody> </table> <p style="text-align: center;"><b>MEMBER</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">MID</th><th style="width: 35%;">NAME</th><th style="width: 20%;">DCODE</th><th style="width: 25%;">ISSUEDATE</th></tr> </thead> <tbody> <tr> <td>101</td><td>AGAM SINGH</td><td>R102</td><td>2017-11-30</td></tr> <tr> <td>103</td><td>ARTH JOSEPH</td><td>F102</td><td>2016-12-13</td></tr> <tr> <td>102</td><td>NISHA HANS</td><td>C101</td><td>2017-07-24</td></tr> </tbody> </table> | DCODE      | DTITLE | DTYPE  | F101 | Henry Martin | Folk    | C102 | Dhrupad | Classical  | C101 | The Planets | Classical | F102 | Universal Soldier | Folk     | R102 | A day in life | Rock   | MID  | NAME   | DCODE      | ISSUEDATE | 101 | AGAM SINGH | R102 | 2017-11-30 | 103 | ARTH JOSEPH | F102 | 2016-12-13 | 102 | NISHA HANS | C101 | 2017-07-24 | 6 |
| DCODE | DTITLE            | DTYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| F101  | Henry Martin      | Folk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| C102  | Dhrupad           | Classical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| C101  | The Planets       | Classical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| F102  | Universal Soldier | Folk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| R102  | A day in life     | Rock                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| MID   | NAME              | DCODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ISSUEDATE  |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| 101   | AGAM SINGH        | R102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2017-11-30 |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| 103   | ARTH JOSEPH       | F102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2016-12-13 |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
| 102   | NISHA HANS        | C101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2017-07-24 |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |
|       |                   | <p>(i) To display all details from the table MEMBER in descending order of ISSUEDATE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |        |        |      |              |         |      |         |            |      |             |           |      |                   |          |      |               |        |      |        |            |           |     |            |      |            |     |             |      |            |     |            |      |            |   |

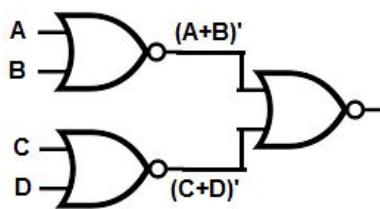
# CBSE AISSCE 2016-2017 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91 Outside Delhi)

|              | <b>Ans</b>   | <code>SELECT * FROM MEMBER ORDER BY ISSUEDATE DESC;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|--------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|---------------|------|------------|---------------|------|-------------|-------------------|------|------------|-------------|--|
|              |              | <i>(½ Mark for correct SELECT statement)<br/>(½ Mark for correct ORDER BY clause)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(ii)</b>  | To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <code>SELECT DCODE,DTITLE FROM DVD WHERE DTTYPE='Folk' ;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct SELECT statement)<br/>(½ Mark for correct WHERE clause)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(iii)</b> | To display the DTTYPE and number of DVDs in each DTTYPE from the table DVD                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <code>SELECT COUNT(*),DTTYPE FROM DVD GROUP BY DTTYPE;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct SELECT statement)<br/>(½ Mark for correct GROUP BY clause)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(iv)</b>  | To display all NAME and ISSUEDATE of those members from the table MEMBER who have DVDs issued (i.e ISSUEDATE) in the year 2017                                                                                                                                                                                                                                                                                                                                                                                            |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <code>SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE&gt;='2017-01-01' AND ISSUEDATE&lt;='2017-12-31' ;</code><br><b>OR</b><br><code>SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE BETWEEN '2017-01-01' AND '2017-12-31' ;</code><br><b>OR</b><br><code>SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE LIKE '2017%';</code>                                                                                                                                                                                   |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct SELECT statement)<br/>(½ Mark for correct WHERE clause)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(v)</b>   | <code>SELECT MIN(ISSUEDATE) FROM MEMBER;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <u>MIN(ISSUEDATE)</u><br>2016-12-13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(vi)</b>  | <code>SELECT DISTINCT DTTYPE FROM DVD;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <u>DISTINCT DTTYPE</u><br>Folk<br>Classical<br>Rock                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct output)<br/>NOTE: Values may be written in any order</i>                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>(vii)</b> | <code>SELECT D.DCODE,NAME,DTITLE<br/>FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE ;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              | <b>Ans</b>   | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 33.33%;"><u>DCODE</u></th> <th style="text-align: left; width: 33.33%;"><u>NAME</u></th> <th style="text-align: left; width: 33.33%;"><u>DTITLE</u></th> </tr> </thead> <tbody> <tr> <td>R102</td> <td>AGAM SINGH</td> <td>A day in life</td> </tr> <tr> <td>F102</td> <td>ARTH JOSEPH</td> <td>Universal Soldier</td> </tr> <tr> <td>C101</td> <td>NISHA HANS</td> <td>The Planets</td> </tr> </tbody> </table> | <u>DCODE</u> | <u>NAME</u> | <u>DTITLE</u> | R102 | AGAM SINGH | A day in life | F102 | ARTH JOSEPH | Universal Soldier | C101 | NISHA HANS | The Planets |  |
| <u>DCODE</u> | <u>NAME</u>  | <u>DTITLE</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |             |               |      |            |               |      |             |                   |      |            |             |  |
| R102         | AGAM SINGH   | A day in life                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |             |               |      |            |               |      |             |                   |      |            |             |  |
| F102         | ARTH JOSEPH  | Universal Soldier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |             |               |      |            |               |      |             |                   |      |            |             |  |
| C101         | NISHA HANS   | The Planets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |             |               |      |            |               |      |             |                   |      |            |             |  |
|              |              | <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |             |               |      |            |               |      |             |                   |      |            |             |  |

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|   | (viii) | <pre>SELECT DTITLE FROM DVD WHERE DTTYPE NOT IN ("Folk", "Classical");</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|-------------|----------------|------|------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|------------|------|------|---------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
|   | Ans    | <u>DTITLE</u><br>A day in life                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   |        | <i>(½ Mark for correct output)</i><br><br><b>NOTE:</b><br><i>No marks to be awarded for any other output</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 6 | a.     | State DeMorgan's Laws of Boolean Algebra and verify them using truth table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2              |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   | Ans    | (i) $(A \cdot B)' = A' + B'$<br>(ii) $(A + B)' = A' \cdot B'$<br><br><b>Truth Table Verification:</b><br>(i) <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th><th>B</th><th><math>A \cdot B</math></th><th><math>(A \cdot B)'</math></th><th><math>A'</math></th><th><math>B'</math></th><th><math>A' + B'</math></th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table><br>(ii) <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th><th>B</th><th><math>A + B</math></th><th><math>(A + B)'</math></th><th><math>A'</math></th><th><math>B'</math></th><th><math>A' \cdot B'</math></th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table> | A              | B    | $A \cdot B$ | $(A \cdot B)'$ | $A'$ | $B'$ | $A' + B'$ | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | A | B | $A + B$ | $(A + B)'$ | $A'$ | $B'$ | $A' \cdot B'$ | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  |
| A | B      | $A \cdot B$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $(A \cdot B)'$ | $A'$ | $B'$        | $A' + B'$      |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0 | 0      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1              | 1    | 1           | 1              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0 | 1      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1              | 1    | 0           | 1              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1 | 0      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1              | 0    | 1           | 1              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1 | 1      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0              | 0    | 0           | 0              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| A | B      | $A + B$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $(A + B)'$     | $A'$ | $B'$        | $A' \cdot B'$  |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0 | 0      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1              | 1    | 1           | 1              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0 | 1      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0              | 1    | 0           | 0              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1 | 0      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0              | 0    | 1           | 0              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1 | 1      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0              | 0    | 0           | 0              |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   |        | <i>(1 Mark for stating any one De Morgan's Theorems correctly)</i><br><i>(1 Mark for correctly verifying any one De Morgan's Theorems using Truth Table)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   | b.     | Draw the Logic Circuit of the following Boolean Expression using only NOR Gates:<br><br>$(A+B) \cdot (C+D)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2              |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   | Ans    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|   |        | <i>(Full 2 Marks for drawing the Logic Circuit for the expression correctly)</i><br>OR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |      |             |                |      |      |           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |            |      |      |               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

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|       |        | <i>(½ Mark for drawing Logic circuit for (A NOR B) correctly)<br/>(½ Mark for drawing Logic circuit for (C NOR D) correctly)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|-------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|------|------------|-----|-------|---|---|--------|---|------|---|---|--------|---|----|---|---|---|---|-----|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| c.    |        | Derive a Canonical POS expression for a Boolean function G, represented by the following truth table: 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|       |        | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th><th>Y</th><th>Z</th><th>G(X, Y, Z)</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> | X          | Y     | Z    | G(X, Y, Z) | 0   | 0     | 0 | 0 | 0      | 0 | 1    | 0 | 0 | 1      | 0 | 1  | 0 | 1 | 1 | 0 | 1   | 0      | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |  |
| X     | Y      | Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | G(X, Y, Z) |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0     | 0      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0     | 0      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0     | 1      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0     | 1      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1     | 0      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1     | 0      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1     | 1      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1     | 1      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1          |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|       | Ans    | $G(X, Y, Z) = (X+Y+Z) \cdot (X+Y+Z') \cdot (X+Y'+Z') \cdot (X'+Y'+Z)$ OR<br>$G(X, Y, Z) = \prod(0, 1, 3, 6)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|       |        | <i>(1 Mark for correctly writing the POS form)<br/>OR<br/>(½ Mark for any two correct terms)<br/>Note: Deduct ½ mark if wrong variable names are written in the expression</i>                                                                                                                                                                                                                                                                                                                                                                                                           |            |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| d.    |        | Reduce the following Boolean expression to its simplest form using K-Map:<br>$E(U, V, Z, W) = \Sigma(2, 3, 6, 8, 9, 10, 11, 12, 13)$ 3                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|       | Ans    | <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td><td>U' V'</td><td>U' V</td><td>UV</td><td>UV'</td></tr> <tr> <td>Z' W'</td><td></td><td></td><td>1    1</td><td></td></tr> <tr> <td>Z' W</td><td></td><td></td><td>1    1</td><td></td></tr> <tr> <td>ZW</td><td>1</td><td></td><td></td><td>1</td></tr> <tr> <td>ZW'</td><td>1    1</td><td></td><td></td><td>1</td></tr> </table><br>OR                                                                                                                                                                           |            | U' V' | U' V | UV         | UV' | Z' W' |   |   | 1    1 |   | Z' W |   |   | 1    1 |   | ZW | 1 |   |   | 1 | ZW' | 1    1 |   |   | 1 |   |   |   |   |   |   |   |   |   |   |   |  |
|       | U' V'  | U' V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | UV         | UV'   |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Z' W' |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1    1     |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Z' W  |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1    1     |       |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| ZW    | 1      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            | 1     |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| ZW'   | 1    1 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            | 1     |      |            |     |       |   |   |        |   |      |   |   |        |   |    |   |   |   |   |     |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

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|       | Z' W' | Z' W | ZW | ZW' |
|-------|-------|------|----|-----|
| U' V' |       |      | 1  | 1   |
| U' V  |       |      |    | 1   |
| UV    | 1     | 1    |    |     |
| UV'   | 1     | 1    | 1  | 1   |

$$E(U, V, Z, W) = UZ' + V' Z + U' ZW'$$

(½ Mark for drawing K-Map with correct variable names)  
 (½ Mark for correctly plotting 1s in the given cells)  
 (½ Mark each for 3 groupings)  
 (½ Mark for writing final expression in reduced/minimal form)

**NOTE**

- Deduct ½ mark if wrong variable names are used
- Deduct ½ mark for any redundant group appearing in final expression

|   |     |                                                                                                                                      |   |
|---|-----|--------------------------------------------------------------------------------------------------------------------------------------|---|
| 7 | (a) | Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies. | 2 |
|---|-----|--------------------------------------------------------------------------------------------------------------------------------------|---|

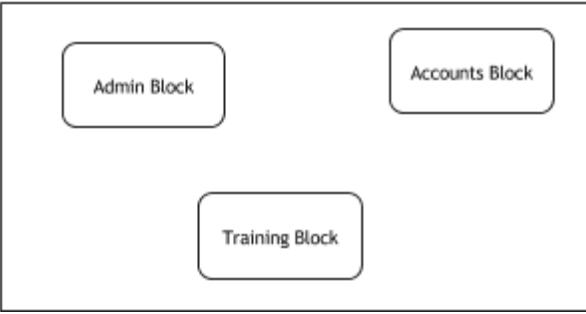
|     |                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ans | <b>Optical Fibre</b> <ul style="list-style-type: none"> <li>• Very Fast</li> <li>• Expensive</li> <li>• Immune to electromagnetic interference</li> </ul> <b>Ethernet Cable -</b> <ul style="list-style-type: none"> <li>• Slower as compared to Optical Fiber</li> <li>• Less Expensive as compared to Optical Fiber</li> <li>• prone to electromagnetic interference</li> </ul> |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                       |  |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <i>Full 2 marks for any one correct difference between Optical Fibre and Ethernet Cable</i><br><i>OR</i><br><i>1 Mark for writing correct features of any one wired medium out of Optical Fibre or Ethernet Cable</i> |  |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (b) | Janish Khanna used a pen drive to copy files from his friend's laptop to his office computer. Soon his office computer started abnormal functioning. Sometimes it would restart by itself and sometimes it would stop different applications running on it. Which of the following options out of (i) to (iv), would have caused the malfunctioning of the computer? Justify the reason for your chosen option:<br>(i) Computer Virus<br>(ii) Spam Mail<br>(iii) Computer Bacteria<br>(iv) Trojan Horse | 2 |
| Ans | (i) Computer Virus<br><br>OR                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |

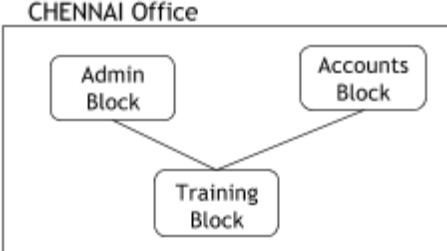
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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|--|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <p><b>(iv) Trojan Horse</b></p> <p><b>Justification:</b></p> <ul style="list-style-type: none"> <li>● Pen drive containing Computer Virus / Trojan Horse was used before the abnormal functioning started, which might have corrupted the system files.</li> <li>● Computer Virus/ Trojan Horse affects the system files and start abnormal functioning in the computer</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|  |     | <p><b>(1 Mark for writing any of the options (i) OR (iv))</b></p> <p><b>(1 Mark for writing any one correct justification)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
|  | (c) | <p>Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Ms.Sen?</p> <p>Justify the reason for your chosen option:</p> <p>(i) Hacker<br/>         (ii) Cracker<br/>         (iii) Operator<br/>         (iv) Network Admin</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 |
|  | Ans | <p><b>(i) Hacker</b></p> <p>A Hacker is a person who breaks into the network of an organization without any malicious intent.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|  |     | <p><b>(1 Mark for writing correct option)</b></p> <p><b>(1 Mark for writing correct justification)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|  | (d) | <p>Hi Standard Tech Training Ltd is a Mumbai based organization which is expanding its office set-up to Chennai. At Chennai office compound, they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has a number of computers, which are required to be connected in a network for communication, data and resource sharing.</p> <p>As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised by them in (i) to (iv), as per the distances between various blocks/locations and other given parameters.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p><b>CHENNAI Office</b></p>  </div> <div style="text-align: center;"> <p><b>MUMBAI</b></p>  </div> </div> |   |

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|                                      |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|--------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------|----------------------------------|------------|-------------------------------|------------|--------------------------------------|---------|----------------|-----|----------------|----|-------------|----|--|
|                                      |            | <p>Shortest distances between various blocks/locations:</p> <table border="1"> <tr><td>Admin Block to Account Block</td><td>300 Metres</td></tr> <tr><td>Accounts Block to Training Block</td><td>150 Metres</td></tr> <tr><td>Admin Block to Training Block</td><td>200 Metres</td></tr> <tr><td>MUMBAI Head Office to CHENNAI Office</td><td>1300 KM</td></tr> </table> <p>Number of computers installed at various blocks are as follows:</p> <table border="1"> <tr><td>Training Block</td><td>150</td></tr> <tr><td>Accounts Block</td><td>30</td></tr> <tr><td>Admin Block</td><td>40</td></tr> </table> | Admin Block to Account Block | 300 Metres | Accounts Block to Training Block | 150 Metres | Admin Block to Training Block | 200 Metres | MUMBAI Head Office to CHENNAI Office | 1300 KM | Training Block | 150 | Accounts Block | 30 | Admin Block | 40 |  |
| Admin Block to Account Block         | 300 Metres |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| Accounts Block to Training Block     | 150 Metres |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| Admin Block to Training Block        | 200 Metres |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| MUMBAI Head Office to CHENNAI Office | 1300 KM    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| Training Block                       | 150        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| Accounts Block                       | 30         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
| Admin Block                          | 40         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | (i)        | Suggest the most appropriate block/location to house the SERVER in the CHENNAI Office (out of the 3 blocks) to get the best and effective connectivity. Justify your answer.                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                            |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | Ans        | <b>Training Block - Because it has maximum number of computers.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      |            | <b>(½ Mark for correct Block/location)<br/>(½ Mark for valid justification)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | (ii)       | Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various blocks within the CHENNAI office compound.                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1                            |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | Ans        | <b>Best wired medium: Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable</b><br>                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      |            | <b>(½ Mark for writing best wired medium)<br/>(½ Mark for drawing the layout correctly)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | (iii)      | Suggest a device/software and its placement that would provide data security for the entire network of the CHENNAI office.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                            |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | Ans        | <b>Firewall - Placed with the server at the Training Block</b><br><b>OR</b><br><b>Any other valid device/software name</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      |            | <b>(½ Mark for writing device/software name correctly)<br/>(½ Mark for writing correct placement)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | (iv)       | Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the CHENNAI office                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1                            |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      | Ans        | <b>Device Name: WiFi Router OR WiMax OR RF Router OR Wireless Modem OR RF Transmitter</b><br><b>Protocol : WAP OR 802.16 OR TCP/IP OR VOIP OR MACP OR 802.11</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |
|                                      |            | <b>(Full 1 Mark for either writing correct writing device name OR writing correct protocol )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |            |                                  |            |                               |            |                                      |         |                |     |                |    |             |    |  |

# CBSE AISSCE 2015-2016 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

## General Instructions:

- The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++ Language / Python only
- In C++ / Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

## SECTION A - (Only for candidates, who opted for C++)

|   |     |                                                                                                                                                                                                                                                                                                                              |   |
|---|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a) | <p>Out of the following, find those identifiers, which cannot be used for naming Variable, Constants or Functions in a C++ program:</p> <p>_Cost, Price*Qty, float, Switch,<br/>Address One, Delete, Number12, do</p>                                                                                                        | 2 |
|   | Ans | <p><b>Price*Qty</b><br/><b>float</b><br/><b>Address One</b><br/><b>do</b></p> <p><b>(½ Mark for each correct name)</b></p> <p><b>Note:</b><br/><b>Deduct ½ Mark for each wrong name written</b></p>                                                                                                                          |   |
|   | (b) | <p>Jayapriya has started learning C++ and has typed the following program. When she compiled the following code written by her, she discovered that she needs to include some header files to successfully compile and execute it. Write the names of those header files, which are required to be included in the code.</p> | 1 |

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|     |                                                                                                                                                                                                                                                                                                                                                                |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre>void main() {     float A,Number,Outcome;     cin&gt;&gt;A&gt;&gt;Number;     Outcome=pow(A,Number);     cout&lt;&lt;Outcome&lt;&lt;endl; }</pre>                                                                                                                                                                                                         |   |
| Ans | <ul style="list-style-type: none"><li>• iostream.h OR iomanip.h</li><li>• math.h</li></ul> <p><i>(½ Mark for writing each correct header file)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"><li>• <i>Ignore any other header files, if mentioned.</i></li><li>• <i>complex.h is acceptable in place of math.h</i></li></ul>                   |   |
| (c) | <p>Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre>#define Equation(p,q) = p+2*q void main() {     float A=3.2;B=4.1;     C=Equation(A,B);     cout&lt;&lt;'Output='&lt;&lt;C&lt;&lt;endl; }</pre> | 2 |
| Ans | <pre><u>#define Equation(p,q) p+2*q</u> void main() {     float A=3.2_,_B=4.1;     <u>float</u> C=Equation(A,B);     cout&lt;&lt;<u>"Output="</u>&lt;&lt;C&lt;&lt;endl; }</pre> <p><i>(½ Mark for each correction)</i></p> <p><b>OR</b></p> <p><i>(1 mark for identifying the errors, without suggesting corrections)</i></p>                                  |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (d) | <p>Find and write the output of the following C++ program code:<br/>Note: Assume all required header files are already included in the program.</p> <pre>typedef char STRING[80]; void MIXITNOW(STRING S) {     int Size=strlen(S);     for (int I=0;I&lt;Size-1;I+=2)     {         char WS=S[I];         S[I]=S[I+1];         S[I+1]=WS;     }     for (I=1;I&lt;Size;I+=2)         if (S[I]&gt;='M' &amp;&amp; S[I]&lt;='U')             S[I]='@'; } void main() {     STRING Word="CRACKAJACK";     MIXITNOW(Word);     cout&lt;&lt;Word&lt;&lt;endl; }</pre> | 2 |
| Ans | <p><b>RCCAAKAKJJC</b></p> <p><i>(2 Marks for correct output)</i></p> <p><i>OR</i></p> <p><i>(½ Mark for each of two correct consecutive alphabets not exceeding 1½ marks )</i></p>                                                                                                                                                                                                                                                                                                                                                                                |   |
| (e) | <p>Find and write the output of the following C++ program code:<br/>Note: Assume all required header files are already being included in the program.</p> <pre>class Stock {     long int ID;</pre>                                                                                                                                                                                                                                                                                                                                                               | 3 |

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```
float Rate; int Date;
public:
    Stock () {ID=1001;Rate=200;Date=1;}
    void RegCode(long int I,float R)
    {
        ID=I;    Rate=R;
    }
    void Change(int New,int DT)
    {
        Rate+=New; Date=DT;
    }
    void Show()
    {
        cout<<"Date :"<<Date<<endl;
        cout<<ID<<"#"<<Rate<<endl;
    }
};

void main()
{
    Stock A,B,C;
    A.RegCode(1024,150);
    B.RegCode(2015,300);
    B.Change(100,29);
    C.Change(-20,20);
    A.Show();
    B.Show();
    C.Show();
}
```

Ans      Date :1  
1024#150  
Date :29  
2015#400  
Date :20  
1001#180

*(½ Mark for each correct line of output)*

**Note:**

- Deduct only ½ Mark for not writing any or all ‘Date’ OR ‘:’ OR ‘#’ symbol(s)
- Deduct ½ Mark for not considering any or all endl(s) at proper

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|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-------|-------|--------------|--------------|---------------------|---------------------|--|----------------------------|--------------|-------------|---------|---------|----------------|----------------|-----------------------|--|---|
|                       | <p><i>place(s)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| (f)                   | <p>Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable CHANGER.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Assume all the required header files are already being included in the code.</li> <li>The function random(n) generates an integer between 0 and n-1</li> </ul> <pre> void main() {     randomize();     int CHANGER;     CHANGER=random(3);     char CITY[][25]={"DELHI","MUMBAI","KOLKATA" , "CHENNAI"};     for(int I=0;I&lt;=CHANGER;I++)     {         for(int J=0;J&lt;=I;J++)             cout&lt;&lt;CITY[J];         cout&lt;&lt;endl;     } } </pre> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;"><b>(i)</b></td><td style="padding: 5px;"><b>(ii)</b></td></tr> <tr> <td style="padding: 5px;">DELHI</td><td style="padding: 5px;">DELHI</td></tr> <tr> <td style="padding: 5px;">DELHIMUMABAI</td><td style="padding: 5px;">DELHIMUMABAI</td></tr> <tr> <td style="padding: 5px;">DELHIMUMABAIKOLKATA</td><td style="padding: 5px;">DELHIMUMABAIKOLKATA</td></tr> <tr> <td style="padding: 5px;"></td><td style="padding: 5px;">DELHIMUMABAIKOLKATACHENNAI</td></tr> <tr> <td style="padding: 5px;"><b>(iii)</b></td><td style="padding: 5px;"><b>(iv)</b></td></tr> <tr> <td style="padding: 5px;">MUMABAI</td><td style="padding: 5px;">KOLKATA</td></tr> <tr> <td style="padding: 5px;">MUMABAIKOLKATA</td><td style="padding: 5px;">KOLKATACHENNAI</td></tr> <tr> <td style="padding: 5px;">MUMABAIKOLKATACHENNAI</td><td style="padding: 5px;"></td></tr> </table> | <b>(i)</b> | <b>(ii)</b> | DELHI | DELHI | DELHIMUMABAI | DELHIMUMABAI | DELHIMUMABAIKOLKATA | DELHIMUMABAIKOLKATA |  | DELHIMUMABAIKOLKATACHENNAI | <b>(iii)</b> | <b>(iv)</b> | MUMABAI | KOLKATA | MUMABAIKOLKATA | KOLKATACHENNAI | MUMABAIKOLKATACHENNAI |  | 2 |
| <b>(i)</b>            | <b>(ii)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| DELHI                 | DELHI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| DELHIMUMABAI          | DELHIMUMABAI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| DELHIMUMABAIKOLKATA   | DELHIMUMABAIKOLKATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
|                       | DELHIMUMABAIKOLKATACHENNAI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| <b>(iii)</b>          | <b>(iv)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| MUMABAI               | KOLKATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| MUMABAIKOLKATA        | KOLKATACHENNAI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| MUMABAIKOLKATACHENNAI |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |
| Ans                   | <p>(i)</p> <p>DELHI</p> <p>DELHIMUMABAI</p> <p>DELHIMUMABAIKOLKATA</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |             |       |       |              |              |                     |                     |  |                            |              |             |         |         |                |                |                       |  |   |

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**Minimum Value of CHANGER = 0  
Maximum Value of CHANGER = 2**

**(1 Mark for mentioning correct option)**

**Note: No Mark to be awarded for writing any one additional option with (i) .**

**(½ Mark each for Minimum and Maximum Value of CHANGER)**

2. (a) Differentiate between Constructor and Destructor functions giving suitable example using a class in C++. When does each of them execute? 2

**Ans PART 1:**

| Constructor                                       | Destructor                                                            |
|---------------------------------------------------|-----------------------------------------------------------------------|
| A constructor function has same name as the class | A destructor function has same name as the class preceded by ~ symbol |

**Example:**

```
class Exam
{
    int Eno;  float Marks;
public:
    Exam() //Constructor
    {
        Eno=1; Marks = 100;
        cout<<"Constructor executed..."<<endl;
    }
    void Show()
    {
        cout<<Eno<<"#"<<Marks<<endl;
    }
    ~Exam() //Destructor
    {
        cout<<"Exam Over"<<endl;
    }
};
void main()
{
    Exam E; //Executes constructor
    E.Show();
```

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} //Executes Destructor

OR

Any other suitable example demonstrating difference between Constructor and Destructor functions.

## PART 2:

### Execution of Constructor and Destructor:

| Constructor                                                     | Destructor                                                       |
|-----------------------------------------------------------------|------------------------------------------------------------------|
| A constructor executes by itself at the time of object creation | A destructor executes by itself when the scope of an object ends |

## PART 1:

(1 Mark for correct example of constructor and destructor function)

OR

(½ Mark each for correct definition of constructor and destructor function)

## PART 2:

(1 Mark for constructor and Destructor execution with/without example )

- (b) Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files are included:

```
class FICTION
{
    long FCode;
    char FTitle[20];
    float FPrice;
public:
    FICTION()                                //Member Function 1
    {
        cout<<"Bought"<<endl;
        FCode=100; strcpy(FTitle,"Noname") ;FPrice=50;
    }

    FICTION(int C,char T[],float P)  //Member Function 2
    {
        FCode=C;
        strcpy(FTitle,T) ;
```

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```
    FPrice=P;
}
void Increase(float P)          //Member Function 3
{
    FPrice+=P;
}
void Show()                     //Member Function 4
{
    cout<<FCode<<" :"<<FTitle<<" :"<<FPrice<<endl;
}
~FICTION()                      //Member Function 5
{
    cout<<"Fiction removed!"<<endl;
}
void main()                      //Line 1
{
    FICTION F1,F2(101,"Dare",75); //Line 2
    for (int I=0;I<4;I++)        //Line 3
    {
        //Line 4
        F1.Increase(20);F2.Increase(15); //Line 5
        F1.Show();F2.Show();           //Line 6
    }                                //Line 7
}                                //Line 8
}                                //Line 9
```

|      |                                                                                                                                                                                                                                                                                                    |   |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|      |                                                                                                                                                                                                                                                                                                    |   |
| (i)  | Which specific concept of object oriented programming out of the following is illustrated by Member Function 1 and Member Function 2 combined together?<br><ul style="list-style-type: none"><li>• Data Encapsulation</li><li>• Data Hiding</li><li>• Polymorphism</li><li>• Inheritance</li></ul> | 1 |
| Ans  | <b>Polymorphism</b><br><i>(1Mark for mentioning the correct concept name )</i>                                                                                                                                                                                                                     |   |
| (ii) | How many times the message "Fiction removed!" will be displayed after executing the above C++ code? Out of Line 1 to Line 9, which line is responsible to display the message "Fiction removed!"?                                                                                                  | 1 |

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|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|                   | <p><b>Ans</b>    2 times<br/>Line 9</p> <p><i>( ½ Mark for writing correct number of times)<br/>( ½ Mark for writing correct line number)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
| <p><b>(c)</b></p> | <p>Write the definition of a class METROPOLIS in C++ with following description:</p> <p>Private Members</p> <ul style="list-style-type: none"><li>- Mcode //Data member for Code (an integer)</li><li>- MName //Data member for Name (a string)</li><li>- MPop //Data member for Population (a long int)</li><li>- Area //Data member for Area Coverage (a float)</li><li>- PopDens //Data member for Population Density (a float)</li><li>- CalDen() //A member function to calculate -----<br/>//Density as PopDens/Area</li></ul> <p>Public Members</p> <ul style="list-style-type: none"><li>- Enter() //A function to allow user to enter values of<br/>//Mcode,MName,MPop,Area and call CalDen()<br/>//function</li><li>- ViewALL() //A function to display all the data members<br/>//also display a message "Highly Populated Area"<br/>//if the Density is more than 12000</li></ul> | 4 |
| <p><b>Ans</b></p> | <pre>class METROPOLIS {     int Mcode;     char MName[20];     long int MPop;     float Area;     float PopDens;     void CalDen(); public:     void Enter();     void ViewALL(); }; void METROPOLIS::Enter() {     cin&gt;&gt;Mcode;     gets(MName); //OR cin&gt;&gt;MName;     cin&gt;&gt;MPop;     cin&gt;&gt;Area;     CalDen();</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |

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```
}

void METROPOLIS::ViewALL()
{
    cout<<Mcode<<MName<<MPop<<Area<<PopDens; //Ignore endl
    if (PopDens>12000)
        cout<<"Highly Populated Area"; //Ignore endl
}
void METROPOLIS::CalDen()
{
    PopDens= PopDens/Area; //OR PopDens = MPop/Area
}

(1/2 Mark for correct syntax for class header)
(1/2 Mark for correctly ending the class declaration with a semicolon)
(1/2 Mark for correct declaration of data members)
(1/2 Mark for correct definition of CalDen() function)
(1 Mark for correct definition of Enter() with proper invocation of CalDen() function)
(1 Mark for correct definition of ViewALL())
```

#### NOTE:

- Deduct ½ Mark if CalDen() is not invoked properly inside Enter() function
- Marks not to be deducted if any or all the member functions are defined inside the class
- Marks not to be deducted if Density is declared as an extra data member and calculated as Density=PopDens/Area inside CalDen() function
- Marks not to be deducted if Density is declared as an extra data member and checked as if (Density>12000) in lieu of if (PopDens>12000) inside ViewALL() function

(d) Answer the questions (i) to (iv) based on the following:

```
class PRODUCT
{
    int Code;
    char Item[20];
protected:
    float Qty;
public:
    PRODUCT();
```

4

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```
    void GetIn(); void Show();
};

class WHOLESALER
{
    int WCode;
protected:
    char Manager[20];
public:
    WHOLESALER();
    void Enter();
    void Display();
};

class SHOWROOM : public PRODUCT, private WHOLESALER
{
    char Name[20],City[20];
public:
    SHOWROOM();
    void Input();
    void View();
};
```

|     |                                                                                                                                                                                                                                            |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     | <p>(i) Which type of Inheritance out of the following is illustrated in the above example?</p> <ul style="list-style-type: none"><li>- Single Level Inheritance</li><li>- Multi Level Inheritance</li><li>- Multiple Inheritance</li></ul> |  |
| Ans | <p><b>Multiple Inheritance</b><br/><i>(1 Mark for writing correct option)</i></p>                                                                                                                                                          |  |
|     | <p>(ii) Write the names of all the data members, which are directly accessible from the member functions of class SHOWROOM.</p>                                                                                                            |  |
| Ans | <p><b>Name, City, Manager, Qty</b><br/><i>(1 Mark for correct answer)</i></p>                                                                                                                                                              |  |
|     | <p><b>Note:</b><br/><i>No marks to be awarded for any partial answer</i></p>                                                                                                                                                               |  |
|     | <p>(iii) Write the names of all the member functions, which are directly accessible by an object of class SHOWROOM.</p>                                                                                                                    |  |
| Ans | <p><b>Input(), View(), GetIn(), Show()</b></p>                                                                                                                                                                                             |  |

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|                        |                               | <p><b>(1 Mark for correct answer)</b></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• No marks to be awarded for any partial answer</li> <li>• Ignore constructor functions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                      |                     |                               |                        |                               |             |                               |   |
|------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|---------------------|-------------------------------|------------------------|-------------------------------|-------------|-------------------------------|---|
|                        | (iv)                          | What will be the order of execution of the constructors, when an object of class SHOWROOM is declared?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                      |                     |                               |                        |                               |             |                               |   |
|                        | Ans                           | <p><b>(i) PRODUCT()</b><br/> <b>(ii) WHOLESALER()</b><br/> <b>(iii) SHOWROOM()</b></p> <p><b>(1 Mark for writing correct order)</b></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• No Marks to be awarded for any other combination/order.</li> <li>• Names of the constructor/class without parenthesis is acceptable.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                      |                     |                               |                        |                               |             |                               |   |
| 3                      | (a)                           | <p>Write the definition of a function FixPay(float Pay[], int N) in C++, which should modify each element of the array Pay having N elements, as per the following rules:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 2px;">Existing Value of Pay</th> <th style="padding: 2px;">Pay to be changed to</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">If less than 100000</td> <td style="padding: 2px;">Add 25% in the existing value</td> </tr> <tr> <td style="padding: 2px;">If &gt;=100000 and &lt;20000</td> <td style="padding: 2px;">Add 20% in the existing value</td> </tr> <tr> <td style="padding: 2px;">If &gt;=200000</td> <td style="padding: 2px;">Add 15% in the existing value</td> </tr> </tbody> </table> | Existing Value of Pay | Pay to be changed to | If less than 100000 | Add 25% in the existing value | If >=100000 and <20000 | Add 20% in the existing value | If >=200000 | Add 15% in the existing value | 2 |
| Existing Value of Pay  | Pay to be changed to          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                      |                     |                               |                        |                               |             |                               |   |
| If less than 100000    | Add 25% in the existing value |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                      |                     |                               |                        |                               |             |                               |   |
| If >=100000 and <20000 | Add 20% in the existing value |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                      |                     |                               |                        |                               |             |                               |   |
| If >=200000            | Add 15% in the existing value |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                      |                     |                               |                        |                               |             |                               |   |
|                        | Ans                           | <pre style="font-family: monospace; font-size: 10pt;"> void FixPay(float Pay[ ], int N) {     for (int i=0;i&lt;N;i++)         if(Pay[i]&lt;100000)             Pay[i]+= 0.25 * Pay[i];         else if (Pay[i]&gt;=100000 &amp;&amp; Pay[i]&lt;20000)             Pay[i]+= 0.2 * Pay[i];         else if(Pay[i]&gt;=200000)             Pay[i]+= 0.15 * Pay[i]; } </pre> <p>OR</p> <p>Any other correct equivalent function definition</p> <p><b>( ½ Mark for correctly writing the loop)</b></p>                                                                                                                                                                                                                                                                                                                       |                       |                      |                     |                               |                        |                               |             |                               |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <p>( <i>½ Mark for checking at least one or all of the conditions correctly</i>)<br/>( <i>1 Mark for correct increment of Pays for all conditions</i>)<br/><b>OR</b><br/>( <i>½ Mark for incrementing only one of the pays correctly</i>)</p> <p><b>Note:</b></p> <ul style="list-style-type: none"><li>• <i>Marks not to be deducted for writing second condition check for the range as <math>&gt;=100000 \&amp;&amp; &lt;\underline{200000}</math> instead of <math>&gt;=100000 \&amp;&amp; &lt;\underline{20000}</math></i></li><li>• <i>Marks not to be deducted for incrementing Salary as <math>\text{Pay}[i] += \text{Pay}[i] * 20 / 100;</math> OR <math>\text{Pay}[i] += 20 / 100 * \text{Pay}[i];</math> and likewise for all increments</i></li></ul> |   |
| (b) | T[20][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[15][5], if the element T[10][8] is stored at the memory location 52000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3 |
| Ans | <pre>Loc(T[I][J])     =BaseAddress + W [( I - LBR)*C + (J - LBC)] (Where W=size of each element = 4 bytes, R=Number of Rows=20, C=Number of Columns=50) Assuming LBR = LBC = 0  LOC(T[10][8])     52000 = BaseAddress + W[ I*C + J]     52000 = BaseAddress + 4[10*50 + 8]     52000 = BaseAddress + 4[500 + 8]     52000 = BaseAddress + 4 * 508     BaseAddress = 52000 - 2032                 = 49968  LOC(T[15][5])= BaseAddress + W[ I*C + J]                 = 49968 + 4[15*50 + 5]                 = 49968 + 4[750 + 5]                 = 49968 + 4 * 755                 = 49968 + 3020                 = 52988  OR Loc(T[I][J])     =ReferenceAddress + W [( I - LR)*C + (J - LC)] (Where</pre>                                                          |   |

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**W=size of each element = 4 bytes,  
R=Number of Rows=20, C=Number of Columns=50  
ReferenceAddress= Address of given cell T[10][8]=52000  
LR = Row value of given cell = 10  
LC = Column value of given cell = 8  
LOC(T[15][5])= LOC(T[10][8]) + 4[(15 - 10)\*50 + (5 - 8)]**

$$\begin{aligned} \text{LOC}(T[15][5]) &= 52000 + 4[5*50 + (-3)] \\ &= 52000 + 4[250 - 3] \\ &= 52000 + 4 \times 247 \\ &= 52000 + 988 \\ &= 52988 \end{aligned}$$

**(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)**

**(1Mark for correct calculation )**

**(1 Mark for final correct address)**

- (c) Write the definition of a member function INSERT() for a class QUEUE in C++, to insert an ITEM in a dynamically allocated Queue of items considering the following code is already written as a part of the program.

```
struct ITEM
{
    int INO; char INAME[20];
    ITEM *Link;
};

class QUEUE
{
    ITEM *R,*F;
public:
    QUEUE () {R=NULL;F=NULL;}
    void INSERT ();
    void DELETE ();
    ~QUEUE ();
};
```

4

Ans **void QUEUE::INSERT ()**  
{

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```
ITEM *T = new ITEM;
cin>>T->INO;
gets(T->INAME); //OR cin>> T->INAME;
T->Link = NULL;
if(R==NULL)
{
    F=T;      R=T;
}
else
{
    R->Link=T;      R=T;
}
}
```

*( 1 Mark for creating a new node)*

*( ½ Mark for entering data for the new node)*

*( ½ Mark for assigning NULL to link of the new node)*

*( ½ Mark for assigning Front to the first node as F = T)*

*( ½ Mark for linking the last node to the new node as R->Link =T)*

*( 1 Mark for assigning Rear to the new node as R = T)*

- (d) Write definition for a function SHOWMID(int P[][5],int R,int C) in C++ to display the elements of middle row and middle column from a two dimensional array P having R number of rows and C number of columns.

For example, if the content of array is as follows:

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| 115 | 112 | 116 | 101 | 125 |
| 103 | 101 | 121 | 102 | 101 |
| 185 | 109 | 109 | 160 | 172 |

The function should display the following as output :

103 101 121 102 101

116 121 109

ANS void SHOWMID(int P[][5],int R,int C)  
{  
 for (int J=0;J<C;J++)  
 cout<<P[R/2][J]<< " ";  
 cout<<endl;  
 for (int I=0;I<R;I++)

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```
    cout<<P[I][C/2]<< " ";
}
OR
void SHOWMID(int P[][][5],int R,int C)
{
    if(R%2!=0)
    {
        for (int J=0;J<C;J++)
            cout<<P[R/2][J]<< " ";
    }
    else
        cout<<"No Middle Row";
    cout<<endl;
    if(C%2!=0)
    {
        for (int I=0;I<R;I++)
            cout<<P[I][C/2]<< " ";
    }
    else
        cout<<"No Middle Column";
}
OR
Any other correct equivalent function definition

(½ Mark for correct loop for displaying middle row elements)
(1 Mark for correct statement to display middle row elements)
(½ Mark for correct loop for displaying middle column elements)
(1 Mark for correct statement to display middle column elements)
```

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.

A/ (B+C) \*D-E

Ans A/ (B+C) \*D-E

$$= (((A / (B+C)) * D) - E)$$

| Element | Stack of Operators | Postfix Expression |
|---------|--------------------|--------------------|
| (       |                    |                    |

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|          |    |                |
|----------|----|----------------|
| (        |    |                |
| (        |    |                |
| <b>A</b> |    | <b>A</b>       |
| /        | /  | <b>A</b>       |
| (        | /  | <b>A</b>       |
| <b>B</b> | /  | <b>AB</b>      |
| +        | /+ | <b>AB</b>      |
| <b>C</b> | /+ | <b>ABC</b>     |
| )        | /  | <b>ABC+/-</b>  |
| )        |    | <b>ABC+/</b>   |
| *        | *  | <b>ABC+/</b>   |
| <b>D</b> | *  | <b>ABC+/D*</b> |
| )        |    | <b>ABC+/D*</b> |
| -        | -  | <b>ABC+/D*</b> |
| <b>E</b> | -  | <b>ABC+/D*</b> |
| )        |    | <b>ABC+/D*</b> |

= **ABC+/D\***

**OR**

**A / (B+C) \* D - E**

= (A / (B+C) \* D - E)

| Element  | Stack of Operators | Postfix Expression |
|----------|--------------------|--------------------|
| (        | (                  |                    |
| <b>A</b> | (                  | <b>A</b>           |
| /        | (/                 | <b>A</b>           |
| (        | (/()               | <b>A</b>           |
| <b>B</b> | (/()               | <b>AB</b>          |
| +        | (/(+               | <b>AB</b>          |
| <b>C</b> | (/(+               | <b>ABC</b>         |
| )        | (/                 | <b>ABC+/-</b>      |
| *        | (*/                | <b>ABC+/</b>       |
| <b>D</b> | (*/                | <b>ABC+/D*</b>     |
| -        | (/-                | <b>ABC+/D*</b>     |
| <b>E</b> | (/-                | <b>ABC+/D*</b>     |
| )        |                    | <b>ABC+/D*</b>     |

= **ABC+/D\***

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|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|    | <p>OR</p> <p>Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.</p> <p><i>(½ Mark for correctly converting till each operator)</i></p> <p>OR</p> <p><i>(1 Mark to be given for writing correct answer without showing the stack content on each step)</i></p>                                                                                                                                                                                                                                                                                                                    |   |
| 4. | <p>(a) Write function definition for WORD4CHAR() in C++ to read the content of a text file FUN.TXT, and display all those words, which has four characters in it.</p> <p>Example:</p> <p>If the content of the file fun.TXT is as follows:</p> <div style="border: 1px solid black; padding: 5px;"><p>When I was a small child, I used to play in the garden<br/>with my grand mom. Those days were amazingly funful<br/>and I remember all the moments of that time</p></div> <p>The function WORD4CHAR() should display the following:</p> <div style="border: 1px solid black; padding: 5px;"><p>When used play with days were that time</p></div> | 2 |
|    | <p>Ans</p> <pre>void WORD4CHAR() {     ifstream Fil;     Fil.open("FUN.TXT");     char W[20];     Fil&gt;&gt;W;     while(!Fil.eof())      //OR while(Fil)     {         if (strlen(W)) == 4 ) //Ignore words ending with '.'             cout&lt;&lt;W&lt;&lt; " ";         Fil&gt;&gt;W;     }     Fil.close();      //Ignore }</pre> <p>OR</p> <p>Any other correct function definition</p> <p><i>(½ Mark for opening FUN.TXT correctly)</i></p> <p><i>(½ Mark for reading each word (using any method) from the file)</i></p>                                                                                                                     |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <i>(½ Mark for checking length of the extracted word to be of 4 letters)<br/>(½ Mark for displaying the 4 letter extracted word correctly)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| (b) | <p>Write a definition for function BUMPER( ) in C++ to read each object of a binary file GIFTS.DAT, find and display details of those gifts, which has remarks as “ON DISCOUNT”. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below:</p> <pre>class GIFTS {     int ID;char Gift[20],Remarks[20]; float Price; public:     void Takeonstock()     {         cin&gt;&gt;ID;gets(Gift);gets(Remarks);cin&gt;&gt;Price;     }     void See()     {         cout&lt;&lt;ID&lt;&lt;" :"&lt;&lt;Gift&lt;&lt;" :"&lt;&lt;Price&lt;&lt;" :"&lt;&lt;Remarks&lt;&lt;endl;     }     char *GetRemarks(){return Remarks;} };</pre> | 3 |
| Ans | <pre>void BUMPER() {     GIFTS G;     ifstream fin;     fin.open("GIFTS.DAT", ios::binary);     while(fin.read((char*)&amp;G, sizeof(G)))     {         if(strcmp(G.GetRemarks(), "ON DISCOUNT")==0)             G.See();     }     fin.close(); //Ignore }</pre> <p>OR</p> <p>Any other correct function definition</p> <p><i>(1Mark for opening GIFTS .DAT correctly)<br/>(½ Mark for reading records from GIFTS.DAT)<br/>(½ Mark for comparing Remarks with ON DISCOUNT (ignore case sensitive checking))<br/>(1 Mark for displaying record)</i></p>                                                                                                                       |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (c) | <p>Find the output of the following C++ code considering that the binary file MEM.DAT exists on the hard disk with a data of 1000 members.</p> <pre> <b>class MEMBER</b> {     int Mcode;char MName[20]; public:     void Register();void Display(); };  <b>void main()</b> {     fstream MFile;     MFile.open("MEM.DAT",ios::binary ios::in);     MEMBER M;     MFile.read((char*)&amp;M, sizeof(M));     cout&lt;&lt;"Rec:"&lt;&lt;MFile.tellg()/sizeof(M)&lt;&lt;endl;     MFile.read((char*)&amp;M, sizeof(M));     MFile.read((char*)&amp;M, sizeof(M));     cout&lt;&lt;"Rec:"&lt;&lt;MFile.tellg()/sizeof(M)&lt;&lt;endl;     MFile.close(); } </pre> | 1 |
| Ans | <p>Rec:1<br/>Rec:3</p> <p>(½ Mark for each correct value of <code>MFile.tellg()/sizeof(M)</code> as 1 and 3 respectively)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |

## SECTION B - (Only for candidates, who opted for Python)

|     |                                                                                                                                                                                                                                  |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1   | <p>(a) Out of the following, find those identifiers, which can not be used for naming Variable or Functions in a Python program:</p> <p><u>_Cost, Price*Qty, float, Switch,</u><br/><u>Address One, Delete, Number12, do</u></p> | 2 |
| Ans | <p><u>Price*Qty, float, Address One, do</u></p> <p>(½ Mark for each correct name)</p> <p><b>Note:</b><br/><b>Deduct ½ Mark for each wrong name written</b></p>                                                                   |   |
| (b) | Name the Python Library modules which need to be imported to invoke the following functions<br>(i) <code>load()</code><br>(ii) <code>pow()</code>                                                                                | 1 |

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|    |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|----|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|----|--------|--------|----|-------|------------|----|--------|----------------|----|--------|--|----|--------|--|--|--------|--|--|
|    | Ans    | (i) pickle<br>(ii) math                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    |        | <b>(½ Mark for writing each correct Library modules)</b><br><br><b>Note: Ignore any other Library modules, if mentioned.</b>                                                                                                                                                                                                                                                                                                                                                                     |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    | (c)    | Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.<br><br><pre>for Name in [Amar, Shveta, Parag]     IF Name[0]=='S':         print(Name)</pre>                                                                                                                                                                                                                                                                                | 2  |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    | Ans    | <pre>for Name in ["Amar", "Shveta", "Parag"] : // ` ` can be used     <u>if</u> Name[0] == 'S':         print(Name)</pre>                                                                                                                                                                                                                                                                                                                                                                        |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    |        | <b>(½ Mark for each correction)</b><br><b>OR</b><br><b>(1 mark for identifying the errors, without suggesting corrections)</b>                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    | (d)    | Find and write the output of the following python code:<br><br><pre>Numbers=[9,18,27,36] for Num in Numbers:     for N in range(1, Num%8):         print(N, "#", end="") print()</pre>                                                                                                                                                                                                                                                                                                           | 2  |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    | Ans    | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td>1#</td> <td>()</td> <td>()</td> </tr> <tr> <td>1#</td> <td>(1 # )</td> <td>(1 # )</td> </tr> <tr> <td>2#</td> <td>(1 #)</td> <td>(1 # 2 # )</td> </tr> <tr> <td>1#</td> <td>(2 # )</td> <td>(1 # 2 # 3 # )</td> </tr> <tr> <td>2#</td> <td>(1 # )</td> <td></td> </tr> <tr> <td>3#</td> <td>(2 # )</td> <td></td> </tr> <tr> <td></td> <td>(3 # )</td> <td></td> </tr> </tbody> </table> | 1# | () | () | 1# | (1 # ) | (1 # ) | 2# | (1 #) | (1 # 2 # ) | 1# | (2 # ) | (1 # 2 # 3 # ) | 2# | (1 # ) |  | 3# | (2 # ) |  |  | (3 # ) |  |  |
| 1# | ()     | ()                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
| 1# | (1 # ) | (1 # )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
| 2# | (1 #)  | (1 # 2 # )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
| 1# | (2 # ) | (1 # 2 # 3 # )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
| 2# | (1 # ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
| 3# | (2 # ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    | (3 # ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |
|    |        | <b>(2 marks for correct output)</b><br><b>OR</b><br><b>(½ mark for each correct value with '#' not exceeding 2 Marks)</b><br><b>OR</b>                                                                                                                                                                                                                                                                                                                                                           |    |    |    |    |        |        |    |       |            |    |        |                |    |        |  |    |        |  |  |        |  |  |

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|                                                                                                               | <p><b>(2 mark for mentioning the syntax error in line</b></p> <pre>print(N, "#", end="") )</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                       |                                                                                                               |                                                                                                                                                               |  |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| (e)                                                                                                           | Find and write the output of the following python code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3                 |                       |                                                                                                               |                                                                                                                                                               |  |
|                                                                                                               | <pre>class Notes:     def __init__(self, N=100, Nt="CBSE"): #constructor         self.Nno=N         self.NName=Nt     def Allocate(self, N, Nt):         self.Nno= self.Bno + N         self.NName= Nt + self.NName     def Show(self):         print(self.Nno, "#", self.NName) s=Notes() t=Notes(200) u=Notes(300, "Made Easy") s.Show() t.Show() u.Show() s.Allocate(4, "Made ") t.Allocate(10, "Easy ") u.Allocate(25, "Made Easy") s.Show() t.Show() u.Show()</pre>                                                                                                                                                                                                                                                       |                   |                       |                                                                                                               |                                                                                                                                                               |  |
| Ans                                                                                                           | <table border="1"> <thead> <tr> <th>Python 2.7 output</th><th>Other Versions output</th></tr> </thead> <tbody> <tr> <td>100 # CBSE<br/>200 # CBSE<br/>300 # Made Easy<br/>104 # Made CBSE<br/>210 # Easy CBSE<br/>325 # Made EasyMade Easy</td><td>(100, '#', 'CBSE')<br/>(200, '#', 'CBSE')<br/>(300, '#', 'Made Easy')<br/>(104, '#', 'Made CBSE')<br/>(210, '#', 'Easy CBSE')<br/>(325, '#', 'Made EasyMade Easy')</td></tr> </tbody> </table> <p><b>(½ Mark for each correct line of output)</b></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Deduct ½ Mark for not writing any or all ‘#’ symbol(s)</li> <li>• Deduct ½ Mark for not considering any or all line breaks at proper place(s)</li> </ul> | Python 2.7 output | Other Versions output | 100 # CBSE<br>200 # CBSE<br>300 # Made Easy<br>104 # Made CBSE<br>210 # Easy CBSE<br>325 # Made EasyMade Easy | (100, '#', 'CBSE')<br>(200, '#', 'CBSE')<br>(300, '#', 'Made Easy')<br>(104, '#', 'Made CBSE')<br>(210, '#', 'Easy CBSE')<br>(325, '#', 'Made EasyMade Easy') |  |
| Python 2.7 output                                                                                             | Other Versions output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   |                       |                                                                                                               |                                                                                                                                                               |  |
| 100 # CBSE<br>200 # CBSE<br>300 # Made Easy<br>104 # Made CBSE<br>210 # Easy CBSE<br>325 # Made EasyMade Easy | (100, '#', 'CBSE')<br>(200, '#', 'CBSE')<br>(300, '#', 'Made Easy')<br>(104, '#', 'Made CBSE')<br>(210, '#', 'Easy CBSE')<br>(325, '#', 'Made EasyMade Easy')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |                       |                                                                                                               |                                                                                                                                                               |  |
| (f)                                                                                                           | What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable PICKER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2                 |                       |                                                                                                               |                                                                                                                                                               |  |

# CBSE AISSCE 2015-2016 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

```
import random
PICK=random.randint(0,3)
CITY=["DELHI","MUMBAI","CHENNAI","KOLKATA"];
for I in CITY:
    for J in range(1,PICK):
        print(I,end="")
    print()
```

| (i)            | (ii)                  |
|----------------|-----------------------|
| DELHIDELHI     | DELHI                 |
| MUMBAIMUMBAI   | DELHIMUMBAI           |
| CHENNAICHENNAI | DELHIMUMBAICHENNAI    |
| KOLKATAKOLKATA |                       |
| (iii)          | (iv)                  |
| DELHI          | DELHI                 |
| MUMBAI         | MUMBAIMUMBAI          |
| CHENNAI        | KOLKATAKOLKATAKOLKATA |
| KOLKATA        |                       |

Ans Option (i) and (iii) are possible

OR

Option (i) only

PICK maxval=3 minval=0

**(1 Mark for mentioning correct option(s))**

Note: No marks to be awarded for writing any other option.

**(½ Mark each for Minimum and Maximum Value of PICK)**

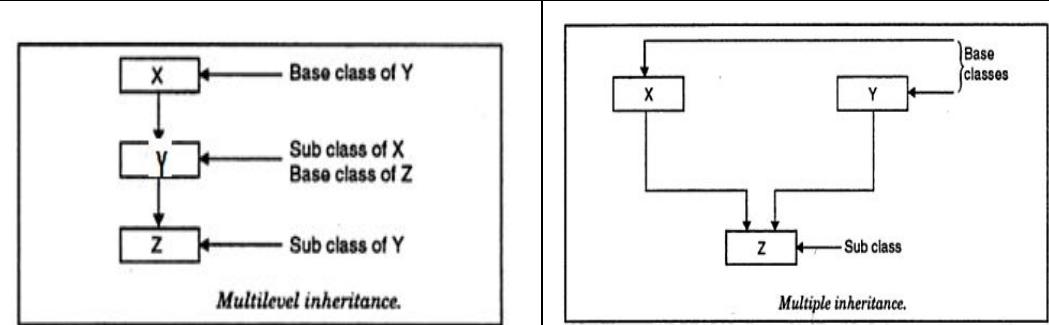
2 (a) What is the difference between Multilevel and Multiple inheritance? Give suitable examples to illustrate both. 2

Ans

|                        |                      |
|------------------------|----------------------|
| Multilevel inheritance | Multiple inheritance |
|------------------------|----------------------|

# CBSE AISSCE 2015-2016 Marking Scheme for Computer Science

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X is the parent class of Y and Y is the parent class of Z

The child class Z has parents X and Y

**( 1 mark for correct difference)  
(1 mark for correct example)**

**(b)** What will be the output of the following python code considering the following set of inputs? 2

JAYA  
My 3 books  
PICK2  
2120

Also, explain the try and except used in the code.

```

Counter=0
while True:
    try:
        Number=int(raw_input("Give a Number"))
        break
    except ValueError:
        Counter=Counter+2
        print("Re-enter Number")
print(Counter)
    
```

**Ans** Output:  
Give a Number JAYA  
Re-enter Number  
Give a Number My 3 books  
Re-enter Number  
Give a Number PICK2  
Re-enter Number

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <p><b>Give a Number 2120</b></p> <p>6</p> <p>Explanation: The code inside try makes sure that the valid number is entered by the user. When any input other than an integer is entered, a value error is thrown and it prompts the user to enter another value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|     | <p><i>(½ mark for correct output for text entry)</i></p> <p><i>(½ mark for correct output for number entry)</i></p> <p><i>(1 mark for correct explanation of try and except)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
| (c) | <p>Write a class CITY in Python with following specifications</p> <p>Instance Attributes</p> <ul style="list-style-type: none"><li>- Code # Numeric value</li><li>- Name # String value</li><li>- Pop # Numeric value for Population</li><li>- KM # Numeric value</li><li>- Density # Numeric value for Population Density</li></ul> <p>Methods:</p> <ul style="list-style-type: none"><li>- CalDen() # Method to calculate Density as Pop/KM</li><li>- Record() # Method to allow user to enter values<br/>Code,Name,Pop,KM and call CalDen() method</li><li>- See() # Method to display all the members also display<br/>a message "Highly Populated Area"<br/>if the Density is more than 12000.</li></ul> | 4 |
| Ans | <pre>class CITY:<br/>    def __init__(self):<br/>        self.Code = 0<br/>        self.Name = ""<br/>        self.Pop = 0<br/>        self.KM = 0<br/>        self.Density=0<br/>    def CalDen(self):<br/>        self.Density = self.Pop / self.KM<br/>    def Record(self):<br/>        self.Code = input("Enter Code")<br/>        self.Name = raw_input("Enter Name")<br/>        self.Pop = input("Enter population")<br/>        self.KM = input("Enter KM")<br/>        CalDen(self) // or self.CalDen()<br/>    def See(self):</pre>                                                                                                                                                                |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre>print Code,Name,Pop, KM, Density if self.Density &gt; 12000:     print("Highly Populated Area")     # OR print("Highly populated Area")</pre> <p>Note: Accept self._Code to indicate private members</p>                                                                                                                                                                                                                                                  |   |
|     | <p><i>(½ Mark for correct syntax for class header)</i><br/><i>(1 Mark for correct declaration of instance attributes)</i><br/><i>(½ Mark for correct definition of CalDen() function)</i><br/><i>(1 Mark for correct definition of Record() with proper invocation of CalDen() function)</i><br/><i>(1 Mark for correct definition of See())</i></p> <p><b>NOTE:</b><br/><i>Deduct ½ Mark if CalDen() is not invoked properly inside Record() function</i></p> |   |
| (d) | How do we implement abstract method in python? Give an example for the same.                                                                                                                                                                                                                                                                                                                                                                                   | 2 |
| Ans | <p>Abstract method: An unimplemented method is called an abstract method. When an abstract method is declared in a base class, the derived class has to either define the method or raise “NotImplementedError”</p> <pre>class Shape(object):     def findArea(self):         pass class Square(Shape):     def __init__(self,side):         self.side = side     def findArea(self):         return self.side * self.side</pre>                               |   |
|     | <p><i>( 1 mark for correct explanation)</i><br/><i>( 1 mark for correct example)</i><br/><i>Note : We can use @abstractmethod to enable parent class method to be executed.</i></p>                                                                                                                                                                                                                                                                            |   |
| (e) | What is the significance of super() method? Give an example for the same.                                                                                                                                                                                                                                                                                                                                                                                      | 2 |
| Ans | <p>super() function is used to call base class methods which has been extended in derived class.<br/>EX:</p> <pre>class GradStudent(Student):</pre>                                                                                                                                                                                                                                                                                                            |   |

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|        |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|--------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|-----|----|----|----|--------|----|----|-----|----|----|----|--------|----|----|-----|----|----|----|--------|----|----|----|-----|----|----|--|
|        |     | <pre> def __init__(self):     super(GradStudent, self).__init__()     self.subject = ""     self.working = "" def readGrad(self):     # Call readStudent method of parent class     super(GradStudent, self).readStudent() </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        |     | <p style="text-align: center;"><i>( 1 mark for correct explanation)</i><br/> <i>( 1 mark for correct example)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
| 3.     | (a) | <p>What will be the status of the following list after the First, Second and Third pass of the insertion sort method used for arranging the following elements in descending order?</p> <p style="text-align: center;">22, 24, -64, 34, 80, 43</p> <p>Note: Show the status of all the elements after each pass very clearly underlining the changes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3   |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        | Ans | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td><td style="text-align: center;">22</td><td style="text-align: center;">24</td><td style="text-align: center;">-64</td><td style="text-align: center;">34</td><td style="text-align: center;">80</td><td style="text-align: center;">43</td></tr> <tr> <td style="text-align: center;">Pass 1</td><td style="text-align: center;">24</td><td style="text-align: center;">22</td><td style="text-align: center;">-64</td><td style="text-align: center;">34</td><td style="text-align: center;">80</td><td style="text-align: center;">43</td></tr> <tr> <td style="text-align: center;">Pass 2</td><td style="text-align: center;">24</td><td style="text-align: center;">22</td><td style="text-align: center;">-64</td><td style="text-align: center;">34</td><td style="text-align: center;">80</td><td style="text-align: center;">43</td></tr> <tr> <td style="text-align: center;">Pass 3</td><td style="text-align: center;">34</td><td style="text-align: center;">24</td><td style="text-align: center;">22</td><td style="text-align: center;">-64</td><td style="text-align: center;">80</td><td style="text-align: center;">43</td></tr> </table> |     | 22  | 24 | -64 | 34 | 80 | 43 | Pass 1 | 24 | 22 | -64 | 34 | 80 | 43 | Pass 2 | 24 | 22 | -64 | 34 | 80 | 43 | Pass 3 | 34 | 24 | 22 | -64 | 80 | 43 |  |
|        | 22  | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -64 | 34  | 80 | 43  |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
| Pass 1 | 24  | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -64 | 34  | 80 | 43  |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
| Pass 2 | 24  | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -64 | 34  | 80 | 43  |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
| Pass 3 | 34  | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 22  | -64 | 80 | 43  |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        |     | <p style="text-align: center;"><i>( 1 mark for each correct pass)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        | (b) | <p>For a given list of values in descending order, write a method in python to search for a value with the help of Binary Search method. The method should return position of the value and should return -1 if the value not present in the list.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2   |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        | Ans | <pre> def binarysrch(nums, x):     high = len(nums)     low = 0     while low &lt; high:         mid = (low + high)//2         midval = nums[mid]         if midval &gt; x:             low = mid + 1         elif midval &lt; x:             high = mid         else:             return mid     return -1 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |
|        |     | <p style="text-align: center;"><i>( ½ mark for assignment of high/ub and low/lb)</i><br/> <i>( ½ mark for appropriate looping condition)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |     |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |     |    |    |    |        |    |    |    |     |    |    |  |

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|  |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|--|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  |     | <b>( ½ mark for calculation of Mid)<br/>( ½ mark for changing high/ub and low/lb)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|  | (c) | Write Insert(Place) and Delete(Place) methods in python to add Place and Remove Place considering them to act as Insert and Delete operations of the data structure Queue.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4 |
|  | Ans | <pre>class queue:     place = [ ]     def insert(self):         a = raw_input("Enter place")         queue.place.append(a)     def delete(self):         if (queue.place == [ ]):             print "Queue empty"         else:             print "Deleted element is", queue.place[0]             queue.place.delete()</pre> <p>OR</p> <pre>class queue:     place = [ ]     def insert(self):         a = raw_input("Enter place")         queue.place.append(a)     def delete(self):         if (queue.place == [ ]):             print("Queue empty")         else:             print("Deleted element is", queue.place[0])             queue.place.delete()</pre> |   |
|  |     | <b>( ½ mark insert header)<br/>( ½ mark for accepting a value from user)<br/>( ½ mark for adding value in list)<br/>( ½ mark for delete header)<br/>( ½ mark for checking empty list condition)<br/>( ½ mark for displaying "Empty Message")</b>                                                                                                                                                                                                                                                                                                                                                                                                                        |   |
|  | (d) | Write a method in python to find and display the prime numbers between 2 to N. Pass N as argument to the method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3 |
|  | Ans | <pre>def prime(N):     for a in range(2,N):         for i in range(2,a):             if N%i ==0:                 break</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |

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|         | <pre> print a  OR  def prime(N):     for a in range(2,N):         for i in range(2,a):             if a%i ==0:                 break             else:                 print a </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------|----|----|----|--------|---|---|----|-------|----|-----------|---|------|---|---|---|------|---|---|--|
|         | <p>( <i>½ mark function header</i>)</p> <p>( <i>½ mark first loop</i>)</p> <p>( <i>½ mark for second loop</i>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <i>½ mark for Divisibility check.</i><br><i>01 mark for Displaying view.</i> |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| (e)     | <p>Evaluate the following postfix notation of expression. Show status of stack after every operation.</p> <p>22, 11, /, 14, 10, -, +, 5, -</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2                                                                            |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| Ans     | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Element</th><th style="text-align: left; padding: 2px;">Stack</th></tr> </thead> <tbody> <tr> <td style="padding: 2px;">22</td><td style="padding: 2px;">22</td></tr> <tr> <td style="padding: 2px;">11</td><td style="padding: 2px;">22, 11</td></tr> <tr> <td style="padding: 2px;">/</td><td style="padding: 2px;">2</td></tr> <tr> <td style="padding: 2px;">14</td><td style="padding: 2px;">2, 14</td></tr> <tr> <td style="padding: 2px;">10</td><td style="padding: 2px;">2, 14, 10</td></tr> <tr> <td style="padding: 2px;">-</td><td style="padding: 2px;">2, 4</td></tr> <tr> <td style="padding: 2px;">+</td><td style="padding: 2px;">6</td></tr> <tr> <td style="padding: 2px;">5</td><td style="padding: 2px;">6, 5</td></tr> <tr> <td style="padding: 2px;">-</td><td style="padding: 2px;">1</td></tr> </tbody> </table> <p><b>Final Result = 1</b></p> | Element                                                                      | Stack | 22 | 22 | 11 | 22, 11 | / | 2 | 14 | 2, 14 | 10 | 2, 14, 10 | - | 2, 4 | + | 6 | 5 | 6, 5 | - | 1 |  |
| Element | Stack                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 22      | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 11      | 22, 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| /       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 14      | 2, 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 10      | 2, 14, 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| -       | 2, 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| +       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 5       | 6, 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| -       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
|         | <p>(<i>½ Mark for evaluation till each operator</i>)</p> <p><b>OR</b></p> <p>(<i>1 Mark for only writing the Final answer without showing stack status</i>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| 4       | (a) Write a statement in Python to perform the following operations:<br><ul style="list-style-type: none"> <li>• To open a text file “BOOK.TXT” in read mode</li> <li>• To open a text file “BOOK.TXT” in write mode</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                                                                            |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |
| Ans     | <pre> f1 = open("BOOK.TXT",'r') f2 = open("BOOK.TXT", 'w') </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                              |       |    |    |    |        |   |   |    |       |    |           |   |      |   |   |   |      |   |   |  |

# CBSE AISSCE 2015-2016 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91/1 Delhi)

|     |                                                                                                                                                                                                                                                     |   |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <b>( ½ Mark for each correct statement)</b>                                                                                                                                                                                                         |   |
| (b) | Write a method in python to write multiple line of text contents into a text file myfile.txt line.                                                                                                                                                  | 2 |
| Ans | <pre>def writel():     f = open("myfile.txt", 'w')     while True:         line = raw_input("Enter line")         f.write(line)         choice = raw_input("Are there more lines")         if choice == 'N':             break;     f.close()</pre> |   |
|     | <b>Note:</b> Using writelines() is also correct                                                                                                                                                                                                     |   |
|     | <i>(½ Mark for opening file in appropriate mode)</i><br><i>(½ Mark for end of file check and loop)</i><br><i>(½ Mark for taking input from user)</i><br><i>(½ Mark for writing the line into the file)</i>                                          |   |
| (c) | Consider the following definition of class Staff, write a method in python to search and display the content in a pickled file staff.dat, where Staffcode is matching with 'S0105'.                                                                 | 3 |
|     | <pre>class Staff:     def __init__(self,S,SNM):         self.Staffcode=S         self.Name=SNM     def Show(self):         print(self.Staffcode," - ",self.Name)</pre>                                                                              |   |
| Ans | <pre>def search():     f = open("staff.dat", 'rb')     try:         while True:             e = pickle.load(f)             if e.Staffcode == 'S0105':                 e.Show()     except EOFError:         pass     f.close()</pre>                |   |
|     | <i>(½ Mark for correct function header)</i><br><i>(½ Mark for opening the file staff.dat correctly)</i><br><i>(½ Mark for correct file check and loop)</i>                                                                                          |   |

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|  |                                                                                                                                                 |  |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <p><i>(½ Mark for correct load())</i><br/> <i>(½ Mark for correct checking of Staffcode)</i><br/> <i>(½ Mark for displaying the record)</i></p> |  |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------|--|

## SECTION C - (For all the candidates)

|   |     |                                                                                                                                                                                                                     |   |
|---|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 5 | (a) | Observe the following STUDENTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in LIST ? Also, find the Degree and Cardinality of the LIST. | 2 |
|---|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>STUDENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>EVENTS</b> |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|------|------|-----------|-----------|-------------|-----------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------|-----------|---------|-------------|-------------|---------|-------------|---|-------------|------|---------|---|---------------|------|-------------|---|---------------|------|---------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">NO</th><th style="text-align: left; padding: 2px;">NAME</th></tr> </thead> <tbody> <tr> <td style="text-align: left; padding: 2px;">1</td><td style="text-align: left; padding: 2px;">Tara Mani</td></tr> <tr> <td style="text-align: left; padding: 2px;">2</td><td style="text-align: left; padding: 2px;">Jaya Sarkar</td></tr> <tr> <td style="text-align: left; padding: 2px;">3</td><td style="text-align: left; padding: 2px;">Tarini Trikha</td></tr> </tbody> </table> |           | NO            | NAME | 1    | Tara Mani | 2         | Jaya Sarkar | 3         | Tarini Trikha | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">EVENTCODE</th><th style="text-align: left; padding: 2px;">EVENTNAME</th></tr> </thead> <tbody> <tr> <td style="text-align: left; padding: 2px;">1001</td><td style="text-align: left; padding: 2px;">Programming</td></tr> <tr> <td style="text-align: left; padding: 2px;">1002</td><td style="text-align: left; padding: 2px;">IT Quiz</td></tr> </tbody> </table> |   | EVENTCODE | EVENTNAME | 1001    | Programming | 1002        | IT Quiz |             |   |             |      |         |   |               |      |             |   |               |      |         |
| NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tara Mani                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Jaya Sarkar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
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| 1002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | IT Quiz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
| <b>LIST</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
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| NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | EVENTCODE | EVENTNAME     |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
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| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Jaya Sarkar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1001      | Programming   |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
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| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tarini Trikha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1001      | Programming   |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |      |      |           |           |             |           |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |           |           |         |             |             |         |             |   |             |      |         |   |               |      |             |   |               |      |         |

|     |                                                                                                                                                                                                                                                                                      |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Ans | <p><b>Cartesian Product</b></p> <p><b>Degree = 4</b></p> <p><b>Cardinality = 6</b></p> <p><i>(1 Mark for writing the correct name of RDBMS operation)</i><br/> <i>(½ Mark for writing correct value of degree)</i><br/> <i>(½ Mark for writing correct value of cardinality)</i></p> | 6 |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

| (b)  | Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables                                                                                                                                                                                                                                                                                                                                                                                     | 6     |       |       |     |           |     |  |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-----|-----------|-----|--|
|      | <p><b>Table: VEHICLE</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">CODE</th><th style="text-align: left; padding: 2px;">VTYPE</th><th style="text-align: left; padding: 2px;">PERKM</th></tr> </thead> <tbody> <tr> <td style="text-align: left; padding: 2px;">101</td><td style="text-align: left; padding: 2px;">VOLVO BUS</td><td style="text-align: left; padding: 2px;">160</td></tr> </tbody> </table> | CODE  | VTYPE | PERKM | 101 | VOLVO BUS | 160 |  |
| CODE | VTYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PERKM |       |       |     |           |     |  |
| 101  | VOLVO BUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 160   |       |       |     |           |     |  |

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|     |               |     |
|-----|---------------|-----|
| 102 | AC DELUXE BUS | 150 |
| 103 | ORDINARY BUS  | 90  |
| 105 | SUV           | 40  |
| 104 | CAR           | 20  |

Note:

- PERKM is Freight Charges per kilometer
- VTYPE is Vehicle Type

Table: TRAVEL

| NO  | NAME         | TDATE      | KM  | CODE | NOP |
|-----|--------------|------------|-----|------|-----|
| 101 | Janish Kin   | 2015-11-13 | 200 | 101  | 32  |
| 103 | Vedika Sahai | 2016-04-21 | 100 | 103  | 45  |
| 105 | Tarun Ram    | 2016-03-23 | 350 | 102  | 42  |
| 102 | John Fen     | 2016-02-13 | 90  | 102  | 40  |
| 107 | Ahmed Khan   | 2015-01-10 | 75  | 104  | 2   |
| 104 | Raveena      | 2016-05-28 | 80  | 105  | 4   |
| 106 | Kripal Anya  | 2016-02-06 | 200 | 101  | 25  |

Note:

- NO is Traveller Number
- KM is Kilometer travelled
- NOP is number of travellers travelled in vehicle
- TDATE is Travel Date

(i) To display NO, NAME, TDATE from the table TRAVEL in descending order of NO.

Ans    `SELECT NO, NAME, TDATE FROM TRAVEL  
ORDER BY NO DESC;`

*(½ Mark for SELECT NO, NAME, TDATE FROM TRAVEL)  
(½ Mark for ORDER BY NO DESC)*

(ii) To display the NAME of all the travellers from the table TRAVEL who are traveling by vehicle with code 101 or 102.

Ans    `SELECT NAME FROM TRAVEL  
WHERE CODE='101' OR CODE='102' ;  
OR  
SELECT NAME FROM TRAVEL  
WHERE CODE=101 OR CODE=102 ;`

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|                 |             | <p>OR</p> <pre>SELECT NAME FROM TRAVEL<br/>WHERE CODE IN ('101','102');</pre> <p>OR</p> <pre>SELECT NAME FROM TRAVEL<br/>WHERE CODE IN (101,102);</pre> <p><i>(½ Mark for correct SELECT)</i><br/><i>(½ Mark for correct WHERE )</i></p>                                                                                                                                                                                                                                                                                   |                 |             |   |     |   |     |  |
|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|---|-----|---|-----|--|
|                 | (iii)       | To display the NO and NAME of those travellers from the table TRAVEL who travelled between '2015-12-31' and '2015-04-01'.                                                                                                                                                                                                                                                                                                                                                                                                  |                 |             |   |     |   |     |  |
|                 | Ans         | <pre>SELECT NO, NAME from TRAVEL<br/>WHERE TDATE &gt;= '2015-04-01' AND TDATE &lt;= '2015-12-31';</pre> <p>OR</p> <pre>SELECT NO, NAME from TRAVEL<br/>WHERE TDATE BETWEEN '2015-04-01' AND '2015-12-31';</pre> <p>OR</p> <pre>SELECT NO, NAME from TRAVEL<br/>WHERE TDATE &lt;= '2015-12-31' AND TDATE &gt;= '2015-04-01';</pre> <p>OR</p> <pre>SELECT NO, NAME from TRAVEL<br/>WHERE TDATE BETWEEN '2015-12-31' AND '2015-04-01';</pre> <p><i>(½ Mark for correct SELECT)</i><br/><i>(½ Mark for correct WHERE )</i></p> |                 |             |   |     |   |     |  |
|                 | (iv)        | To display all the details from table TRAVEL for the travellers, who have travelled distance more than 100 KM in ascending order of NOP.                                                                                                                                                                                                                                                                                                                                                                                   |                 |             |   |     |   |     |  |
|                 | Ans         | <pre>SELECT * FROM TRAVEL<br/>WHERE KM &gt; 100 ORDER BY NOP;</pre> <p><i>(½ Mark for correct SELECT)</i><br/><i>(½ Mark for correct WHERE )</i></p>                                                                                                                                                                                                                                                                                                                                                                       |                 |             |   |     |   |     |  |
|                 | (v)         | <pre>SELECT COUNT(*),CODE FROM TRAVEL<br/>GROUP BY CODE HAVING COUNT(*)&gt;1;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |             |   |     |   |     |  |
|                 | Ans         | <table><thead><tr><th><u>COUNT(*)</u></th><th><u>CODE</u></th></tr></thead><tbody><tr><td>2</td><td>101</td></tr><tr><td>2</td><td>102</td></tr></tbody></table> <p><i>(½ Mark for correct output)</i></p>                                                                                                                                                                                                                                                                                                                 | <u>COUNT(*)</u> | <u>CODE</u> | 2 | 101 | 2 | 102 |  |
| <u>COUNT(*)</u> | <u>CODE</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |   |     |   |     |  |
| 2               | 101         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |   |     |   |     |  |
| 2               | 102         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |             |   |     |   |     |  |

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|             | (vi)            | SELECT DISTINCT CODE FROM TRAVEL;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                 |              |      |            |     |     |         |     |  |
|-------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------|--------------|------|------------|-----|-----|---------|-----|--|
|             | Ans             | <u>DISTINCT CODE</u><br>101<br>102<br>103<br>104<br>105<br><i>(½ Mark for correct output)</i><br><i>Note: Ignore the order</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                 |              |      |            |     |     |         |     |  |
|             | (vii)           | SELECT A.CODE ,NAME ,VTYPE<br>FROM TRAVEL A,VEHICLE B<br>WHERE A.CODE=B.CODE AND KM<90 ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                 |              |      |            |     |     |         |     |  |
|             | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>CODE</u></th> <th style="text-align: left;"><u>NAME</u></th> <th style="text-align: left;"><u>VTYPE</u></th> </tr> </thead> <tbody> <tr> <td>104</td> <td>Ahmed Khan</td> <td>CAR</td> </tr> <tr> <td>105</td> <td>Raveena</td> <td>SUV</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                 | <u>CODE</u> | <u>NAME</u>     | <u>VTYPE</u> | 104  | Ahmed Khan | CAR | 105 | Raveena | SUV |  |
| <u>CODE</u> | <u>NAME</u>     | <u>VTYPE</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |              |      |            |     |     |         |     |  |
| 104         | Ahmed Khan      | CAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                 |              |      |            |     |     |         |     |  |
| 105         | Raveena         | SUV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                 |              |      |            |     |     |         |     |  |
|             | (viii)          | SELECT NAME ,KM*PERKM<br>FROM TRAVEL A,VEHICLE B<br>WHERE A.CODE=B.CODE AND A.CODE='105' ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                 |              |      |            |     |     |         |     |  |
|             | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>NAME</u></th> <th style="text-align: left;"><u>KM*PERKM</u></th> </tr> </thead> <tbody> <tr> <td>Raveena</td> <td>3200</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>NAME</u> | <u>KM*PERKM</u> | Raveena      | 3200 |            |     |     |         |     |  |
| <u>NAME</u> | <u>KM*PERKM</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                 |              |      |            |     |     |         |     |  |
| Raveena     | 3200            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                 |              |      |            |     |     |         |     |  |
| 6           | a.              | Verify the following using Boolean Laws.<br>$A' + B' . C = A' . B' . C' + A' . B.C' + A' . B.C + A' . B' . C + A.B' . C$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2           |                 |              |      |            |     |     |         |     |  |
|             | Ans             | <b>LHS</b><br>$  \begin{aligned}  & A' + B' . C \\  &= A' . (B + B') . (C + C') + (A + A') . B' . C \\  &= A' . B . C + A' . B . C' + A' . B' . C + A' . B' . C' + A . B' . C + A' . B' . C \\  &= A' . B . C + A' . B . C' + A' . B' . C + A' . B' . C' + A . B' . C \\  &= A' . B' . C' + A' . B . C' + A' . B . C + A' . B' . C + A . B' . C \\  &= \text{RHS}  \end{aligned}  $ <b>OR</b><br>$  \begin{aligned}  \text{RHS} &= A' . B' . C' + A' . B . C' + A' . B . C + A' . B' . C + A . B' . C \\  &= A' . B' . C + A' . B' . C' + A' . B . C + A' . B . C' + A . B' . C \\  &= A' . B' . (C+C') + A' . B . (C+C') + A . B' . C \\  &= A' . B' + A' . B + A . B' . C \\  &= A' . (B'+B) + A . B' . C  \end{aligned}  $ |             |                 |              |      |            |     |     |         |     |  |

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|     | $  \begin{aligned}  &= A' + A \cdot B' \cdot C \\  &= (A' + A) \cdot (A' + B' \cdot C) \\  &= A' + B' \cdot C = \text{LHS}  \end{aligned}  $ <p><i>(2 Marks for correct Verification)</i></p> <p><b>OR</b></p> <p><i>(1 Mark for expanding LHS up to 1 correct step)</i></p> <p><b>OR</b></p> <p><i>(1 Mark for reducing RHS up to 1 correct step)</i></p>                                                                                                                                                                                                                               |   |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------|---|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| b.  | Write the Boolean Expression for the result of the Logic Circuit as shown below:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Ans | $  \begin{aligned}  &((U + V') \cdot (U + W)) \cdot (V + W') \\  &\text{OR} \\  &(U + V') \cdot (U + W) \cdot (V + W')  \end{aligned}  $ <p><i>(2 Marks for correctly writing the full expression )</i></p> <p><b>OR</b></p> <p><i>(½ Mark each for correctly writing any one term)</i></p>                                                                                                                                                                                                                                                                                              |   |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| c.  | Derive a Canonical POS expression for a Boolean function F, represented by the following truth table:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1 |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|     | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>P</th><th>Q</th><th>R</th><th>F(P, Q, R)</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table> | P | Q          | R | F(P, Q, R) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |  |
| P   | Q                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | R | F(P, Q, R) |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 | 0          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 1          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 | 1          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 0   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 0          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 | 0          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 0          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 | 1          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 1   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 1          |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Ans | $F(P, Q, R) = (P+Q+R) \cdot (P+Q'+R') \cdot (P'+Q+R) \cdot (P'+Q+R')$ <p><b>OR</b></p> $F(P, Q, R) = \pi(0, 3, 4, 5)$ <p><i>(1 Mark for the correctly writing the POS form)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                      |   |            |   |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

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|                                             |                                   | <b>Note: Deduct ½ mark if wrong variable names are used</b>                                                                                                                                                                                                                                                                                                                          |              |              |                                             |                                  |                                        |                                   |  |
|---------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|---------------------------------------------|----------------------------------|----------------------------------------|-----------------------------------|--|
| d.                                          |                                   | Reduce the following Boolean Expression to its simplest form using K-Map:                                                                                                                                                                                                                                                                                                            | 3            |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | $F(X, Y, Z, W) = (2, 6, 7, 8, 9, 10, 11, 13, 14, 15)$                                                                                                                                                                                                                                                                                                                                |              |              |                                             |                                  |                                        |                                   |  |
|                                             | Ans                               |                                                                                                                                                                                                                                                                                                                                                                                      |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   |                                                                                                                                                                                                                                                                                                                                                                                      | <b>OR</b>    |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   |                                                                                                                                                                                                                                                                                                                                                                                      |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | $F(X, Y, Z, W) = XY' + ZW' + XW + YZ$                                                                                                                                                                                                                                                                                                                                                |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | <i>(½ Mark for drawing K-Map with correct variable names)<br/>         (½ Mark each for 4 groupings)<br/>         (½ Mark for writing final expression in reduced/minimal form)</i>                                                                                                                                                                                                  |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | <b>Note: Deduct ½ mark if wrong variable names are written in the expression</b>                                                                                                                                                                                                                                                                                                     |              |              |                                             |                                  |                                        |                                   |  |
| 7                                           | (a)                               | Give two examples of PAN and LAN type of networks.                                                                                                                                                                                                                                                                                                                                   | 1            |              |                                             |                                  |                                        |                                   |  |
|                                             | Ans                               | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PAN Examples</th> <th>LAN Examples</th> </tr> </thead> <tbody> <tr> <td>Connecting two cell phones to transfer data</td> <td>Connecting computers in a school</td> </tr> <tr> <td>Connecting smartphone to a smart watch</td> <td>Connecting computers in an office</td> </tr> </tbody> </table> | PAN Examples | LAN Examples | Connecting two cell phones to transfer data | Connecting computers in a school | Connecting smartphone to a smart watch | Connecting computers in an office |  |
| PAN Examples                                | LAN Examples                      |                                                                                                                                                                                                                                                                                                                                                                                      |              |              |                                             |                                  |                                        |                                   |  |
| Connecting two cell phones to transfer data | Connecting computers in a school  |                                                                                                                                                                                                                                                                                                                                                                                      |              |              |                                             |                                  |                                        |                                   |  |
| Connecting smartphone to a smart watch      | Connecting computers in an office |                                                                                                                                                                                                                                                                                                                                                                                      |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | <i>Note: Any one example of each<br/>         OR<br/>         Any other one/two correct examples for each of PAN and LAN</i>                                                                                                                                                                                                                                                         |              |              |                                             |                                  |                                        |                                   |  |
|                                             |                                   | <i>(½ Mark for any one/two correct examples of PAN)<br/>         (½ Mark for any one/two correct examples of LAN)</i>                                                                                                                                                                                                                                                                |              |              |                                             |                                  |                                        |                                   |  |
|                                             | (b)                               | Which protocol helps us to browse through web pages using internet browsers?<br>Name any one internet browser.                                                                                                                                                                                                                                                                       | 1            |              |                                             |                                  |                                        |                                   |  |

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|                                                                                                                         | <b>Ans</b>                                                                                                                                                                      | <b>Protocol:</b> HTTP OR TCP/IP<br><b>Browser:</b> Chrome OR Internet Explorer OR Firefox OR OPERA OR SAFARI OR any other correct Browser Name                                                                                                                                                                                                                                                                                                                                                                                                 |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------|--|
|                                                                                                                         |                                                                                                                                                                                 | <i>(½ Mark for any one correct protocol name)<br/>(½ Mark for any one correct browser name)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | (c)                                                                                                                                                                             | Write two advantages of 4G over 3G Mobile Telecommunication Technologies in terms of speed and services?                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1            |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | <b>Ans</b>                                                                                                                                                                      | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">4G</th><th style="width: 50%;">3G</th></tr> </thead> <tbody> <tr> <td>Speed approximately 100 mbps</td><td>Speed approximately 2 mbps</td></tr> <tr> <td>LTE True mobile broadband</td><td>Data services with multimedia</td></tr> </tbody> </table>                                                                                                                                                                                   | 4G           | 3G            | Speed approximately 100 mbps                                                                                            | Speed approximately 2 mbps                                                                                                                                                      | LTE True mobile broadband | Data services with multimedia |  |
| 4G                                                                                                                      | 3G                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
| Speed approximately 100 mbps                                                                                            | Speed approximately 2 mbps                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
| LTE True mobile broadband                                                                                               | Data services with multimedia                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         |                                                                                                                                                                                 | <b>OR</b><br>Any other two correct advantages of 4G over 3G in terms of speed and services                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         |                                                                                                                                                                                 | <i>( ½ Mark for each correct advantage)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | (d)                                                                                                                                                                             | Write two characteristics of Web 2.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1            |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | <b>Ans</b>                                                                                                                                                                      | <ul style="list-style-type: none"> <li>● Makes web more interactive through online social media</li> <li>● Supports easy online information exchange</li> <li>● Interoperability on the internet</li> <li>● Video sharing possible in the websites</li> </ul> <b>OR</b><br>Any two of the above or any other two correct characteristics of Web 2.0                                                                                                                                                                                            |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         |                                                                                                                                                                                 | <i>(½ Mark each for any two correct characteristics)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | (e)                                                                                                                                                                             | What is the basic difference between Trojan Horse and Computer Worm?                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1            |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
|                                                                                                                         | <b>Ans</b>                                                                                                                                                                      | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Trojan Horse</th><th style="width: 50%;">Computer Worm</th></tr> </thead> <tbody> <tr> <td>It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them.</td><td>It is a self-replicating computer program. It uses a network to send copies of itself to other nodes (computers on the network) and it may do so without any user intervention.</td></tr> </tbody> </table> | Trojan Horse | Computer Worm | It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them. | It is a self-replicating computer program. It uses a network to send copies of itself to other nodes (computers on the network) and it may do so without any user intervention. |                           |                               |  |
| Trojan Horse                                                                                                            | Computer Worm                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |
| It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them. | It is a self-replicating computer program. It uses a network to send copies of itself to other nodes (computers on the network) and it may do so without any user intervention. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |               |                                                                                                                         |                                                                                                                                                                                 |                           |                               |  |

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|                     | <p><b>OR</b><br/>Any other correct difference between Trojan Horse and Computer Worm</p> <p><b>(1 Mark for writing correct difference between Trojan Horse and Computer Worm)</b></p> <p><b>OR</b></p> <p><b>(½ Mark for writing correct explanation of Trojan Horse)</b></p> <p><b>OR</b></p> <p><b>(½ Mark for writing correct explanation of Computer Worm)</b></p>                                                                                                                                                                                                                                        |                     |                     |           |     |             |     |  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------|-----|-------------|-----|--|
| (f)                 | <p>Categories the following under Client side and Server Side script category?</p> <p>(i) VB Script<br/>(ii) ASP<br/>(iii) JSP<br/>(iv) Java Script</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                   |                     |           |     |             |     |  |
| Ans                 | <table border="1"><thead><tr><th>Client Side Scripts</th><th>Server Side Scripts</th></tr></thead><tbody><tr><td>VB Script</td><td>ASP</td></tr><tr><td>Java Script</td><td>JSP</td></tr></tbody></table> <p><b>(1 Mark for correct answer)</b></p> <p><b>OR</b></p> <p><b>(½ Mark for any two correct client/server side script names)</b></p>                                                                                                                                                                                                                                                               | Client Side Scripts | Server Side Scripts | VB Script | ASP | Java Script | JSP |  |
| Client Side Scripts | Server Side Scripts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                     |           |     |             |     |  |
| VB Script           | ASP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                     |           |     |             |     |  |
| Java Script         | JSP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                     |                     |           |     |             |     |  |
| (g)                 | <p>Uplifting Skills Hub India is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows.</p> <p>As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (iv), keeping in mind the distances between various locations and other given parameters.</p> |                     |                     |           |     |             |     |  |

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**A\_CITY**

Head Office

**B\_HUB**

VILLAGE 3

VILLAGE 2

B\_TOWN

VILLAGE 1

Shortest distances between various locations:

|                             |        |
|-----------------------------|--------|
| VILLAGE 1 to B_TOWN         | 2 KM   |
| VILLAGE 2 to B_TOWN         | 1.0 KM |
| VILLAGE 3 to B_TOWN         | 1.5 KM |
| VILLAGE 1 to VILLAGE 2      | 3.5 KM |
| VILLAGE 1 to VILLAGE 3      | 4.5 KM |
| VILLAGE 2 to VILLAGE 3      | 2.5 KM |
| A_CITY Head Office to B_HUB | 25 Km  |

Number of Computers installed at various locations are as follows:

|               |     |
|---------------|-----|
| B_TOWN        | 120 |
| VILLAGE 1     | 15  |
| VILLAGE 2     | 10  |
| VILLAGE 3     | 15  |
| A_CITY OFFICE | 6   |

Note:

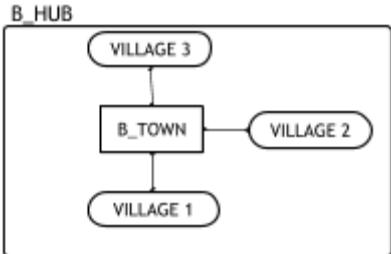
- In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.
- The organization has got financial support from the government and top IT companies.

(i) Suggest the most appropriate location of the SERVER in the B\_HUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer. 1

**Ans** B\_TOWN. Since it has the maximum number of computers and is closest to all other locations.

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(Sub Code: 083 Paper Code 91/1 Delhi)

|            |                                                                                                                                                        |   |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|            | <p><b>(½ Mark for writing correct location name)<br/> (½ Mark for writing any one correct justification)</b></p>                                       |   |
|            | <p>(ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the B_HUB.</p>  | 1 |
| <b>Ans</b> | <p>Best Wired Medium : Optical Fibre</p>                                                                                                               |   |
|            |                                                                       |   |
|            | <p><b>(½ Mark for writing the correct best wired medium name)<br/> (½ Mark for drawing the correct cable layout)</b></p>                               |   |
|            | <p>(iii) Which hardware device will you suggest to connect all the computers within each location of B_HUB?</p>                                        | 1 |
| <b>Ans</b> | <p>Switch OR Hub</p>                                                                                                                                   |   |
|            | <p><b>(1 Mark for writing any one of the above answers)</b></p>                                                                                        |   |
|            | <p>(iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB?</p> | 1 |
| <b>Ans</b> | <p>Videoconferencing OR VoIP OR any other correct service/protocol</p>                                                                                 |   |
|            | <p><b>(1 Mark for writing any one of the above answers)</b></p>                                                                                        |   |

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(Sub Code: 083 Paper Code 91 Outside Delhi)

## General Instructions:

- The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++/Python Language only
- In C++/Python , ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, number of spaces used for indenting may vary
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

## SECTION A - (Only for candidates, who opted for C++)

|    |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1. | (a) | <p>Out of the following, find those identifiers, which can not be used for naming Variable, Constants or Functions in a C++ program:</p> <p><b>Total*Tax, double, Case, My Name,<br/>NeW, switch, Column31, _Amount</b></p>                                                                                                                                                                                                                                                      | 2 |
|    | Ans | <p><b>Total*Tax<br/>double<br/>My Name<br/>switch</b></p> <p><b>(½ Mark for each correct name)</b></p> <p><b>Note:</b></p> <p><b>Deduct ½ Mark for each wrong name written</b></p>                                                                                                                                                                                                                                                                                               |   |
|    | (b) | <p>Ronica Jose has started learning C++ and has typed the following program. When she compiled the following code written by her, she discovered that she needs to include some header files to successfully compile and execute it. Write the names of those header files, which are required to be included in the code.</p> <pre>void main() {     double X,Times,Result;     cin&gt;&gt;X&gt;&gt;Times;     Result=pow(X,Times);     cout&lt;&lt;Result&lt;&lt;endl; }</pre> | 1 |

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|     |                                                                                                                                                                                                                                                                                                                                                              |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Ans | <ul style="list-style-type: none"><li>• <b>iostream.h OR iomanip.h</b></li><li>• <b>math.h</b></li></ul> <p><i>(½ Mark for writing each correct header file)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"><li>• <b>Ignore any other header files, if mentioned.</b></li><li>• <b>complex.h is acceptable in place of math.h</b></li></ul>   |   |
| (c) | <p>Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined.</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre>#define Formula(a,b) = 2*a+b void main() {     float X=3.2;Y=4.1;     Z=Formula(X,Y);     cout&lt;&lt;'Result='&lt;&lt;Z&lt;&lt;endl; }</pre> | 2 |
| Ans | <pre><u>#define Formula(a,b) 2*a+b</u> void main() {     float X=3.2 <u>,</u> Y=4.1;     <u>float</u> Z=Formula(X,Y);     cout&lt;&lt;<u>"Result"</u>&lt;&lt;Z&lt;&lt;endl; }</pre> <p><i>(½ Mark for each correction)</i></p> <p><b>OR</b></p> <p><i>(1 mark for identifying the errors, without suggesting corrections)</i></p>                            |   |
| (d) | <p>Find and write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already included in the program.</p> <pre>typedef char TEXT[80]; void JumbleUp(TEXT T) {     int L=strlen(T);     for (int C=0;C&lt;L-1;C+=2)     {         char CT=T[C];         T[C]=T[C+1];     } }</pre>                               | 2 |

# CBSE AISSCE 2015-2016 Marking Scheme for Computer Science

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre>T[C+1]=CT; } for (C=1;C&lt;L;C+=2)     if (T[C]&gt;='M' &amp;&amp; T[C]&lt;='U' )         T[C]='@'; } void main() {     TEXT Str="HARMONIOUS";     JumbleUp(Str);     cout&lt;&lt;Str&lt;&lt;endl; }</pre>                                                                                                                                                                                                                                                                                                                                                                                         |   |
| Ans | <p>AHM@N@OIS@</p> <p><i>(2 Marks for correct output)</i></p> <p><i>OR</i></p> <p><i>(½ Mark for each of two correct consecutive characters not exceeding 1½ marks)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
| (e) | <p>Find and write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre>class Share {     long int Code;     float Rate;     int DD; public:     Share() {Code=1000;Rate=100;DD=1;}     void GetCode(long int C,float R)     {         Code=C;         Rate=R;     }     void Update(int Change,int D)     {         Rate+=Change;         DD=D;     }     void Status()     {         cout&lt;&lt;"Date:"&lt;&lt;DD&lt;&lt;endl;         cout&lt;&lt;Code&lt;&lt;"#"&lt;&lt;Rate&lt;&lt;endl;     } };</pre> | 3 |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre>void main() {     Share S,T,U;     S.GetCode(1324,350);     T.GetCode(1435,250);     S.Update(50,28);     U.Update(-25,26);     S.Status();     T.Status();     U.Status(); }</pre>                                                                                                                                                                                                                                                   |   |
| Ans | <p>Date:28<br/>1324#400<br/>Date:1<br/>1435#250<br/>Date:26<br/>1000#75</p> <p><i>(½ Mark for each correct line of output)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>● Deduct only ½ Mark for not writing any or all ‘Date’ OR ‘:’ OR ‘#’ symbol(s)</li> <li>● Deduct ½ Mark for not considering any or all endl(s) at proper place(s)</li> </ul>                                                                 |   |
| (f) | <p>Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable PICKER.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>- Assume all the required header files are already being included in the code.</li> <li>- The function random(n) generates an integer between 0 and n-1</li> </ul> | 2 |
|     | <pre>void main() {     randomize();     int PICKER;     PICKER=1+random(3);     char COLOR[5][5]={"BLUE","PINK","GREEN","RED"};     for(int I=0;I&lt;=PICKER; I++)     {         for(int J=0; J&lt;=I;J++)             cout&lt;&lt;COLOR[J];         cout&lt;&lt;endl;     } }</pre>                                                                                                                                                       |   |

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|                   |                                                                                                                                                                                                       | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="padding: 2px;">(i)</th><th style="padding: 2px;">(ii)</th><th style="padding: 2px;">(iii)</th><th style="padding: 2px;">(iv)</th></tr> <tr> <td style="padding: 2px;">PINK</td><td style="padding: 2px;">BLUE</td><td style="padding: 2px;">GREEN</td><td style="padding: 2px;">BLUE</td></tr> <tr> <td style="padding: 2px;">PINKGREEN</td><td style="padding: 2px;">BLUERPINK</td><td style="padding: 2px;">GREENRED</td><td style="padding: 2px;">BLUERPINK</td></tr> <tr> <td style="padding: 2px;">PINKGREENRED</td><td style="padding: 2px;">BLUERPINKGREEN</td><td style="padding: 2px;"></td><td style="padding: 2px;">BLUERPINKGREEN</td></tr> <tr> <td style="padding: 2px;"></td><td style="padding: 2px;">BLUERPINKGREENRED</td><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> </table> | (i)            | (ii) | (iii) | (iv) | PINK | BLUE | GREEN | BLUE      | PINKGREEN | BLUERPINK | GREENRED       | BLUERPINK | PINKGREENRED   | BLUERPINKGREEN    |  | BLUERPINKGREEN |  | BLUERPINKGREENRED |  |  |  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|-------|------|------|------|-------|-----------|-----------|-----------|----------------|-----------|----------------|-------------------|--|----------------|--|-------------------|--|--|--|
| (i)               | (ii)                                                                                                                                                                                                  | (iii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (iv)           |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| PINK              | BLUE                                                                                                                                                                                                  | GREEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | BLUE           |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| PINKGREEN         | BLUERPINK                                                                                                                                                                                             | GREENRED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | BLUERPINK      |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| PINKGREENRED      | BLUERPINKGREEN                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | BLUERPINKGREEN |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | BLUERPINKGREENRED                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | <b>Ans</b>                                                                                                                                                                                            | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">(ii)</td><td style="padding: 2px;"></td><td style="padding: 2px;">(iv)</td></tr> <tr> <td style="padding: 2px;">BLUE</td><td style="padding: 2px;"></td><td style="padding: 2px;">BLUE</td></tr> <tr> <td style="padding: 2px;">BLUERPINK</td><td style="padding: 2px;"></td><td style="padding: 2px;">BLUERPINK</td></tr> <tr> <td style="padding: 2px;">BLUERPINKGREEN</td><td style="padding: 2px;"></td><td style="padding: 2px;">BLUERPINKGREEN</td></tr> <tr> <td style="padding: 2px;">BLUERPINKGREENRED</td><td style="padding: 2px;"></td><td style="padding: 2px;"></td></tr> </table>                                                                                                                                                                                                          |                | (ii) |       | (iv) | BLUE |      | BLUE  | BLUERPINK |           | BLUERPINK | BLUERPINKGREEN |           | BLUERPINKGREEN | BLUERPINKGREENRED |  |                |  |                   |  |  |  |
| (ii)              |                                                                                                                                                                                                       | (iv)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| BLUE              |                                                                                                                                                                                                       | BLUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| BLUERPINK         |                                                                                                                                                                                                       | BLUERPINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| BLUERPINKGREEN    |                                                                                                                                                                                                       | BLUERPINKGREEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| BLUERPINKGREENRED |                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | <i>Minimum Value of PICKER = 1</i><br><i>Maximum Value of PICKER = 3</i>                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | <i>(1 Mark for mentioning both the correct options)</i><br><i>Note: No Mark to be awarded for writing any one additional option with (ii) and (iv).</i><br><b>OR</b><br><i>(½ Mark for only (iv))</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | <i>(½ Mark each for Minimum and Maximum Value of PICKER)</i>                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
| 2                 | (a)                                                                                                                                                                                                   | Write any four important characteristics of Object Oriented Programming? Give example of any one of the characteristics using C++.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2              |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |
|                   | <b>Ans</b>                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>● Encapsulation</li> <li>● Data Hiding</li> <li>● Polymorphism</li> <li>● Inheritance</li> </ul> <p><b>Example of Encapsulation</b></p> <pre style="font-family: monospace; font-size: 10pt; margin: 0;">class student {     int rno;     char name[20]; public:     void input()     {         cin&gt;&gt;rno;         gets(name);     } }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |      |       |      |      |      |       |           |           |           |                |           |                |                   |  |                |  |                   |  |  |  |

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```
void output()
{
    cout<<rno<<" "<<name<<endl;
}
};
```

The data members and member functions are wrapped up together(encapsulated ) into a single unit called class.

OR

Any other suitable example demonstrating a characteristic of Object Oriented Programming.

*(1 Mark for correct names of 4 characteristics of OOP)*

*OR*

*(½ Mark for correct names of any 2 characteristics of OOP)*

*(1 Mark for correct example of 1 characteristic)*

- (b) Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files are included:

```
class BOOK
{
    long Code ;
    char Title[20];
    float Price;
public:
    BOOK()                                //Member Function 1
    {
        cout<<"Bought"<<endl;
        Code=10;strcpy(Title,"NoTitle");Price=100;
    }
    BOOK(int C,char T[],float P)  //Member Function 2
    {
        Code=C;
        strcpy(Title,T);
        Price=P;
    }
    void Update(float P)                  //Member Function 3
    {
        Price+=P;
    }
}
```

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     | <pre> void Display()           //Member Function 4 {     cout&lt;&lt;Code&lt;&lt;:"&lt;&lt;Title&lt;&lt;:"&lt;&lt;Price&lt;&lt;endl; }  ~BOOK()                 //Member Function 5 {     cout&lt;&lt;"Book Discarded!"&lt;&lt;endl; } ;  void main()              //Line 1 {     BOOK B,C(101,"Truth",350); //Line 2     for (int I=0;I&lt;4;I++)      //Line 3     {         //Line 4         B.Update(50);C.Update(20); //Line 5         B.Display();C.Display();   //Line 6     }                           //Line 7 }                           //Line 8                                 //Line 9 </pre> |  |
|     | <p>(i) Which specific concept of object oriented programming out of the following is illustrated by Member Function 1 and Member Function 2 combined together? 1</p> <ul style="list-style-type: none"> <li>● Data Encapsulation</li> <li>● Polymorphism</li> <li>● Inheritance</li> <li>● Data Hiding</li> </ul>                                                                                                                                                                                                                                                                                             |  |
| Ans | <p><b>Polymorphism</b></p> <p><i>(1Mark for mentioning the correct concept name )</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|     | <p>(ii) How many times the message "Book Discarded!" will be displayed after executing the above C++ code? Out of Line 1 to Line 9, which line is responsible to display the message "Book Discarded!" 1</p>                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Ans | <p>2 times<br/>Line 9</p> <p><i>( ½ Mark for writing correct number of times)</i><br/><b>OR</b><br/><i>( ½ Mark for writing - "No execution due to wrong syntax in Line 3"</i><br/><b>OR any other equivalent answer conveying similar meaning)</b></p> <p><i>( ½ Mark for writing correct line number)</i></p>                                                                                                                                                                                                                                                                                               |  |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (c) | Write the definition of a class CITY in C++ with following description:<br><br>Private Members<br>- Ccode //Data member for City Code (an integer)<br>- CName //Data member for City Name (a string)<br>- Pop //Data member for Population (a long int)<br>- KM //Data member for Area Coverage (a float)<br>- Density //Data member for Population Density (a float)<br>- DenCal() //A member function to calculate ---<br>//Density as Pop/KM | 4 |
|     | Public Members<br>- Record() //A function to allow user to enter values of<br>//Acode,Name,Pop,KM and call DenCal() function<br>- View() //A function to display all the data members<br>//also display a message "Highly Populated City"<br>//if the Density is more than 10000                                                                                                                                                                |   |
| Ans | class CITY<br>{<br>int Ccode;<br>char CName[20];<br>long int Pop;<br>float KM;<br>float Density;<br>void DenCal();<br>public:<br>void Record();<br>void View();<br>};<br>void CITY::Record()<br>{<br>cin>>Ccode;<br>gets(CName); //OR cin>>CName;<br>cin>>Pop;<br>cin>>KM;<br>DenCal();<br>}<br>void CITY::View()<br>{                                                                                                                          |   |

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```
cout<<Ccode<<CName<<Pop<<KM<<Density; //Ignore endl
if(Density>10000)
    cout<<"Highly Populated City";           //Ignore endl
}
void CITY::DenCal()
{
    Density= Pop/KM;
}
(½ Mark for correct syntax for class header)
(½ Mark for correctly ending the class declaration with ;)
(½ Mark for correct declaration of data members)
(½ Mark for correct definition of DenCal() function)
(1 Mark for correct definition of Record() with proper invocation of DenCal() function)
(1 Mark for correct definition of View())
NOTE:

- Deduct ½ Mark if DenCal() is not invoked properly inside Record() function
- Marks not to be deducted if any or all the member functions are defined inside the class

```

(d) Answer the questions (i) to (iv) based on the following:

```
class ITEM
{
    int Id;
    char IName[20];
protected:
    float Qty;
public:
    ITEM();
    void Enter(); void View();
};

class TRADER
{
    int DCode;
protected:
    char Manager[20];
public:
    TRADER();
    void Enter();
    void View();
};
```

4

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|     |                                                                                                                                                                                                                                                                                                                      |  |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     | <pre>class SALEPOINT : public ITEM,private TRADER {     char Name[20],Location[20]; public :     SALEPOINT();     void EnterAll();     void ViewAll(); };</pre>                                                                                                                                                      |  |
|     | <p>(i) Which type of Inheritance out of the following is illustrated in the above example?</p> <ul style="list-style-type: none"><li>- Single Level Inheritance</li><li>- Multi Level Inheritance</li><li>- Multiple Inheritance</li></ul>                                                                           |  |
| Ans | <p><b>Multiple Inheritance</b></p> <p><b>(1 Mark for writing correct option)</b></p>                                                                                                                                                                                                                                 |  |
|     | <p>(ii) Write the names of all the data members, which are directly accessible from the member functions of class SALEPOINT.</p>                                                                                                                                                                                     |  |
| Ans | <p><b>Name, Location, Manager, Qty</b></p> <p><b>(1 Mark for correct answer)</b></p> <p><b>Note:</b></p> <p><b>No marks to be awarded for any partial answer</b></p>                                                                                                                                                 |  |
|     | <p>(iii) Write the names of all the member functions, which are directly accessible by an object of class SALEPOINT.</p>                                                                                                                                                                                             |  |
| Ans | <p><b>EnterAll(), ViewAll(), Enter(), View()</b></p> <p><b>(1 Mark for correct answer)</b></p> <p><b>Note: No marks to be awarded for any partial answer</b></p>                                                                                                                                                     |  |
|     | <p>(iv) What will be the order of execution of the constructors, when an object of class SALEPOINT is declared?</p>                                                                                                                                                                                                  |  |
| Ans | <p><b>(i) ITEM()<br/>(ii) TRADER()<br/>(iii) SALEPOINT()</b></p> <p><b>(1 Mark for writing correct order)</b></p> <ul style="list-style-type: none"><li>• <b>No Marks to be awarded for any other combination/order.</b></li><li>• <b>Names of the constructor/class without parenthesis is acceptable</b></li></ul> |  |

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| 3                               | <p><b>(a)</b> Write the definition of a function FixSalary(float Salary[], int N) in C++, which should modify each element of the array Salary having N elements, as per the following rules:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 2px;">Existing Salary Values</th><th style="text-align: center; padding: 2px;">Required Modification in Value</th></tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">If less than 100000</td><td style="text-align: center; padding: 2px;">Add 35% in the existing value</td></tr> <tr> <td style="text-align: center; padding: 2px;">If <math>\geq 100000</math> and <math>&lt; 200000</math></td><td style="text-align: center; padding: 2px;">Add 30% in the existing value</td></tr> <tr> <td style="text-align: center; padding: 2px;">If <math>\geq 200000</math></td><td style="text-align: center; padding: 2px;">Add 20% in the existing value</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                              | Existing Salary Values | Required Modification in Value | If less than 100000 | Add 35% in the existing value | If $\geq 100000$ and $< 200000$ | Add 30% in the existing value | If $\geq 200000$ | Add 20% in the existing value | 2 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------|---------------------|-------------------------------|---------------------------------|-------------------------------|------------------|-------------------------------|---|
| Existing Salary Values          | Required Modification in Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |                                |                     |                               |                                 |                               |                  |                               |   |
| If less than 100000             | Add 35% in the existing value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |                                |                     |                               |                                 |                               |                  |                               |   |
| If $\geq 100000$ and $< 200000$ | Add 30% in the existing value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |                                |                     |                               |                                 |                               |                  |                               |   |
| If $\geq 200000$                | Add 20% in the existing value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                        |                                |                     |                               |                                 |                               |                  |                               |   |
| Ans                             | <pre style="font-family: monospace; font-size: 10pt; margin: 0;">void FixSalary(float Salary[ ], int N) {     for (int i=0;i&lt;N;i++)         if(Salary[i]&lt;100000)             Salary[i]+= 0.35 *Salary[i];         else if (Salary[i]&gt;=100000 &amp;&amp; Salary[i]&lt;200000)             Salary[i]+= 0.3 * Salary[i];         else if(Salary[i]&gt;=200000)             Salary[i]+= 0.20 * Salary[i]; }</pre> <p><b>OR</b></p> <p>Any other correct equivalent function definition</p> <p style="margin-left: 40px;"><i>( ½ Mark for correctly writing the loop)</i><br/> <i>( ½ Mark for correctly checking all conditions)</i><br/> <i>( 1 Mark for correct increment of Salary for all conditions)</i></p> <p><b>OR</b></p> <p style="margin-left: 40px;"><i>( ½ Mark for checking only one of the conditions correctly)</i><br/> <i>( ½ Mark for incrementing only one of the Salary correctly)</i></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Marks not to be deducted for writing second condition check for the range as <math>\geq 100000 \&amp;\&amp; &lt; 200000</math> instead of <math>\geq 100000 \&amp;\&amp; &lt; 20000</math></li> <li>• Marks not to be deducted for incrementing Salary as <math>\text{Salary}[i]+\text{Salary}[i]*20/100;</math> OR<br/> <math>\text{Salary}[i]+\text{Salary}[i]*20/100;</math><br/> and likewise for all increments</li> </ul> |                        |                                |                     |                               |                                 |                               |                  |                               |   |
| (b)                             | <p>R[10][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 8 bytes, find the address of the element R[5][15], if the element R[8][10] is stored at the memory location 45000.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3                      |                                |                     |                               |                                 |                               |                  |                               |   |

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Ans       $\text{Loc}(R[I][J]) = \text{BaseAddress} + W [(I - LBR) * C + (J - LBC)]$   
(where  
W=size of each element = 8 bytes,  
R=Number of Rows=10, C=Number of Columns=50)  
Assuming LBR = LBC = 0  
 $\text{LOC}(R[8][10])$   
 $45000 = \text{BaseAddress} + W[I * C + J]$   
 $45000 = \text{BaseAddress} + 8[8 * 50 + 10]$   
 $45000 = \text{BaseAddress} + 8[400 + 10]$   
 $45000 = \text{BaseAddress} + 8 * 410$   
 $\text{BaseAddress} = 45000 - 3280$   
 $= 41720$   
  
 $\text{LOC}(R[5][15]) = \text{BaseAddress} + W[I * C + J]$   
 $= 41720 + 8[5 * 50 + 15]$   
 $= 41720 + 8[250 + 15]$   
 $= 41720 + 8 * 265$   
 $= 41720 + 2120$   
 $= 43840$   
OR  
 $\text{Loc}(R[I][J]) = \text{Reference Address} + W [(I - LR) * C + (J - LC)]$   
(where  
W=size of each element = 8 bytes,  
R=Number of Rows=10, C=Number of Columns=50)  
Reference Address= Address of given cell R[8][10]=45000  
LR = Row value of given cell = 8  
LC = Column value of given cell = 10  
 $\text{LOC}(R[5][15]) = \text{LOC}(R[8][10]) + 8[(5 - 8) * 50 + (15 - 10)]$   
 $\text{LOC}(R[15][5]) = 45000 + 8[-3 * 50 + 5]$   
 $= 45000 + 8[-150 + 5]$   
 $= 45000 + 8 * (-145)$   
 $= 45000 - 1160$   
 $= 43840$

*(1 Mark for writing correct formula (for Row major) OR substituting formula with correct values)  
(1 Mark for correct calculation )  
(1 Mark for final correct address)*

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| (c) | Write the definition of a member function DELETE() for a class QUEUE in C++, to remove a product from a dynamically allocated Queue of products considering the following code is already written as a part of the program.<br><pre>struct PRODUCT {     int PID; char PNAME[20];     PRODUCT *Next; };  class QUEUE {     PRODUCT *R,*F; public:     QUEUE () {R=NULL;F=NULL; }     void INSERT();     void DELETE();     ~QUEUE (); };</pre>                                                                                                                                                                                                   | 4 |
| Ans | <pre>void QUEUE::DELETE() {     if( F!=NULL)     {         PRODUCT *T = F;         cout&lt;&lt;T-&gt;PID&lt;&lt;T-&gt;PNAME ;         F=F-&gt;Next;         delete T;         if(F==NULL)         {             R=NULL;         }     }     else         cout&lt;&lt;"Queue Empty"; } (<i>½ Mark for checking empty queue</i>) (<i>½ Mark for assigning front to temporary pointer</i>) (<i>1 Mark for reassigning front</i>) (<i>1 Mark for deleting previous front using temporary pointer</i>) (<i>½ Mark for checking emptied queue after deletion</i>) (<i>½ Mark for assigning rear to NULL if queue was emptied after deletion</i>)</pre> |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| (d) | <p>Write definition for a function DISPMID(int A[][5],int R,int C) in C++ to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns.</p> <p>For example, if the content of array is as follows:</p> <table border="1"><tr><td>215</td><td>912</td><td>516</td><td>401</td><td>515</td></tr><tr><td>103</td><td>901</td><td>921</td><td>802</td><td>601</td></tr><tr><td>285</td><td>209</td><td>609</td><td>360</td><td>172</td></tr></table> <p>The function should display the following as output<br/>103 901 921 802 601<br/>516 921 609</p> | 215 | 912 | 516 | 401 | 515 | 103 | 901 | 921 | 802 | 601 | 285 | 209 | 609 | 360 | 172 | 3 |
| 215 | 912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 516 | 401 | 515 |     |     |     |     |     |     |     |     |     |     |     |     |   |
| 103 | 901                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 921 | 802 | 601 |     |     |     |     |     |     |     |     |     |     |     |     |   |
| 285 | 209                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 609 | 360 | 172 |     |     |     |     |     |     |     |     |     |     |     |     |   |
| ANS | <pre>void DISPMID(int A[][5],int R,int C) {     for (int J=0;J&lt;C;J++)         cout&lt;&lt;A[R/2][J]&lt;&lt; " ";     cout&lt;&lt;endl;     for (int I=0;I&lt;R;I++)         cout&lt;&lt;A[I][C/2]&lt;&lt; " "; }  OR  void DISPMID(int A[][5],int R,int C) {     if(R%2!=0)     {         for (int J=0;J&lt;C;J++)             cout&lt;&lt;A[R/2][J]&lt;&lt; " ";     }     else         cout&lt;&lt;"No Middle Row";     cout&lt;&lt;endl;     if(C%2!=0)     {         for (int I=0;I&lt;R;I++)             cout&lt;&lt;A[I][C/2]&lt;&lt; " ";     } }</pre>                                                             |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |

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```

    else
        cout<<"No Middle Column";
}
OR
Any other correct equivalent function definition

(½ Mark for correct loop for displaying middle row elements)
(1 Mark for correct statement to display middle row elements)
(½ Mark for correct loop for displaying middle column elements)
(1 Mark for correct statement to display middle column elements)

```

- |  |                                                                                                                                                 |   |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------|---|
|  | <p>(e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.</p> | 2 |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------|---|

$P / (Q - R) * S + T$

**Ans**  $P / (Q - R) * S + T = (P / (Q - R) * S + T)$

| Element  | Stack of Operators | Postfix Expression |
|----------|--------------------|--------------------|
| (        | (                  |                    |
| <b>P</b> | (                  | <b>P</b>           |
| /        | (/                 | <b>P</b>           |
| (        | (/(                | <b>P</b>           |
| <b>Q</b> | (/(                | <b>PQ</b>          |
| -        | (/(-               | <b>PQ</b>          |
| <b>R</b> | (/(-               | <b>PQR</b>         |
| )        | (/                 | <b>PQR-</b>        |
| *        | (*                 | <b>PQR-/</b>       |
| <b>S</b> | (*)                | <b>PQR-/S</b>      |
| +        | (+                 | <b>PQR-/S*</b>     |
| <b>T</b> | (+                 | <b>PQR-/S*T</b>    |
| )        |                    | <b>PQR-/S*T+</b>   |

$= PQR-/S*T+$

OR

$P / (Q - R) * S + T = (((P / (Q - R)) * S) + T)$

| Element | Stack of Operators | Postfix Expression |
|---------|--------------------|--------------------|
| (       |                    |                    |
| (       |                    |                    |

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|   |    |           |
|---|----|-----------|
| ( |    |           |
| P |    | P         |
| / | /  |           |
| ( |    |           |
| Q |    | PQ        |
| - | /- |           |
| R |    | PQR       |
| ) | /  | PQR-      |
| ) |    | PQR-/     |
| * | *  |           |
| S |    | PQR-/S    |
| ) |    | PQR-/S*   |
| + | +  |           |
| T |    | PQR-/S*T  |
| ) |    | PQR-/S*T+ |

= PQR-/S\*T+

OR

Any other method for converting the given infix expression to its equivalent postfix expression showing stack contents.

*(½ Mark for correctly converting till each operator)*

OR

*(1 Mark to be given for writing correct answer without showing the stack content on each step)*

4. (a) Write function definition for DISP3CHAR() in C++ to read the content of a text file KIDINME.TXT, and display all those words, which have three characters in it.

Example:

If the content of the file KIDINME.TXT is as follows:

When I was a small child, I used to play in the garden  
with my grand mom. Those days were amazingly funful and  
I remember all the moments of that time

2

The function DISP3CHAR() should display the following:

was the mom and all the

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Ans | <pre>void DISP3CHAR() {     ifstream Fil;     Fil.open("KIDINME.TXT");     char W[20];     Fil&gt;&gt;W;     while(!Fil.eof()) // OR while(Fil)     {         if (strlen(W) == 3)             cout&lt;&lt;W&lt;&lt; " ";         Fil&gt;&gt;W;     }     Fil.close(); //Ignore } OR Any other correct function definition</pre> <p><i>(½ Mark for opening KIDINME.TXT correctly)<br/>(½ Mark for reading each word (using any method) from the file)<br/>(½ Mark for checking length of the extracted word to be of 3 letters)<br/>(½ Mark for displaying the 3 letter extracted word correctly)</i></p> <p><b>Note:</b><br/><i>No marks to be deducted if words with length 4 and including a ‘.’ is also checked</i></p> |   |
| (b) | Write a definition for function ONOFFER( ) in C++ to read each object of a binary file TOYS.DAT, find and display details of those toys, which has status as “ON OFFER”. Assume that the file TOYS.DAT is created with the help of objects of class TOYS, which is defined below:                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3 |

```
class TOYS
{
    int TID;char Toy[20],Status[20]; float MRP;
public:
    void Getinstock()
    {
        cin>>TID;gets(Toy);gets(Status);cin>>MRP;
    }
    void View()
    {
        cout<<TID<<" :"<<Toy<<" :"<<MRP<<" :"<<Status<<endl;
    }
    char *SeeOffer(){return Status;}.
}
```

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre style="margin: 0;">};</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| Ans | <pre style="margin: 0;"> void ONOFFER() {     TOYS T;     ifstream fin;     fin.open("TOYS.DAT", ios::binary);     while(fin.read((char*)&amp;T, sizeof(T)))     {         if(strcmp(T.SeeOffer(), "ON OFFER")==0)             T.View();     }     fin.close(); //Ignore }</pre> <p style="text-align: center;"><b>OR</b></p> <p style="text-align: center;">Any other correct function definition</p> <p style="text-align: center;"><i>(1 Mark for opening TOYS.DAT correctly)<br/> (½ Mark for reading records from TOYS.DAT)<br/> (½ Mark for comparing Remarks with ON OFFER (ignore case sensitive checking))<br/> (1 Mark for displaying record)</i></p> |   |
| (c) | <p>Find the output of the following C++ code considering that the binary file CLIENT.DAT exists on the hard disk with a data of 1000 clients.</p> <pre style="margin: 0;"> class CLIENT {     int Ccode; char CName[20]; public:     void Register(); void Display(); };</pre>                                                                                                                                                                                                                                                                                                                                                                                  | 1 |
|     | <pre style="margin: 0;"> void main() {     fstream CFile;     CFile.open("CLIENT.DAT",ios::binary ios::in);     CLIENT C;     CFile.read((char*)&amp;C, sizeof(C));     cout&lt;&lt;"Rec:&lt;&lt;CFile.tellg()/sizeof(C)&lt;&lt;endl;     CFile.read((char*)&amp;C, sizeof(C));     CFile.read((char*)&amp;C, sizeof(C));     cout&lt;&lt;"Rec:&lt;&lt;CFile.tellg()/sizeof(C)&lt;&lt;endl;     CFile.close(); }</pre>                                                                                                                                                                                                                                          |   |

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|  |            |                                                                                                                               |  |
|--|------------|-------------------------------------------------------------------------------------------------------------------------------|--|
|  | <b>Ans</b> | <b>Rec:1</b><br><b>Rec:3</b><br><br><i>(½ Mark for each correct value of CFile.tellg()/sizeof(C) as 1 and 3 respectively)</i> |  |
|--|------------|-------------------------------------------------------------------------------------------------------------------------------|--|

## SECTION B - (Only for candidates, who opted for Python)

|   |            |                                                                                                                                                                                                                    |   |
|---|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1 | (a)        | Out of the following, find those identifiers, which can not be used for naming Variable or Functions in a Python program:<br><br><b>Total*Tax, While, class, switch,<br/>3rdRow, finally, Column31, _Total</b>     | 2 |
|   | <b>Ans</b> | <b>Total*Tax, class, 3rdRow, finally</b><br><br><i>(½ Mark for each correct name)</i><br><b>Note:</b><br><i>Deduct ½ Mark for each wrong name written</i>                                                          |   |
|   | (b)        | Name the Python Library modules which need to be imported to invoke the following functions<br>(i) <b>sqrt()</b><br>(ii) <b>dump()</b>                                                                             | 1 |
|   | <b>Ans</b> | (i) <b>math</b><br>(ii) <b>pickle</b><br><br><i>(½ Mark for writing each correct Library modules)</i><br><br><b>Note: Ignore any other Library modules, if mentioned.</b>                                          |   |
|   | (c)        | Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code.<br><br><pre>for Name in [Ramesh, Suraj, Priya]     IF Name[0]=='S':         print(Name)</pre> | 2 |
|   | <b>Ans</b> | <pre>for Name in ["Ramesh", "Suraj", "Priya"] : // ' ' can be used     if Name[0] == 'S':         print(Name)</pre>                                                                                                |   |
|   |            | <i>(½ Mark for each correction)</i><br><b>OR</b><br><i>(1 mark for identifying the errors, without suggesting corrections)</i>                                                                                     |   |
|   | (d)        | Find and write the output of the following python code:                                                                                                                                                            | 2 |

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|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                                                 |                                              |  |  |                      |  |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------|----------------------------------------------|--|--|----------------------|--|
|                                  | <pre><code>Values=[10,20,30,40] for Val in Values:     for I in range(1, Val%9):         print(I,"*",end="") print()</code></pre>                                                                                                                                                                                                                                                                                                                                                                                        |                                              |                                                 |                                              |  |  |                      |  |
| Ans                              | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px; vertical-align: top;"> 1*<br/> 1*<br/> 2*<br/> 1*<br/> 2*<br/> 3* </td><td style="padding: 5px; vertical-align: top;"> ()<br/> (1, * )<br/> ()<br/> (1 ,* )<br/> (2 ,* )<br/> () </td><td style="padding: 5px; vertical-align: top;"> ()<br/> (1 * )<br/> (1 * 2 * )<br/> (1 * 2 * 3 * ) </td></tr> <tr> <td></td><td></td><td style="padding: 5px; vertical-align: top;"> 1*<br/> 1*2*<br/> 1*2*3* </td></tr> </table> | 1*<br>1*<br>2*<br>1*<br>2*<br>3*             | ()<br>(1, * )<br>()<br>(1 ,* )<br>(2 ,* )<br>() | ()<br>(1 * )<br>(1 * 2 * )<br>(1 * 2 * 3 * ) |  |  | 1*<br>1*2*<br>1*2*3* |  |
| 1*<br>1*<br>2*<br>1*<br>2*<br>3* | ()<br>(1, * )<br>()<br>(1 ,* )<br>(2 ,* )<br>()                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ()<br>(1 * )<br>(1 * 2 * )<br>(1 * 2 * 3 * ) |                                                 |                                              |  |  |                      |  |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1*<br>1*2*<br>1*2*3*                         |                                                 |                                              |  |  |                      |  |
|                                  | <p style="margin-top: 10px;"><i>(2 marks for correct output)</i></p> <p style="margin-top: 10px;"><i>OR</i></p> <p style="margin-top: 10px;"><i>(½ mark for each correct value with '*' not exceeding 2 Marks)</i></p> <p style="margin-top: 10px;"><i>OR</i></p> <p style="margin-top: 10px;"><i>(2 mark for mentioning the syntax error in line print(I,"*",end=""))</i></p>                                                                                                                                           |                                              |                                                 |                                              |  |  |                      |  |
| (e)                              | Find and write the output of the following python code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3                                            |                                                 |                                              |  |  |                      |  |
|                                  | <pre><code>class Book:     def __init__(self,N=100,S="Python"): #constructor         self.Bno=N         self.BName=S     def Assign(self, N,S):         self.Bno= self.Bno + N         self.BName= S + self.BName     def ShowVal(self):         print(self.Bno,"#",self.BName) s=Book() t=Book(200) u=Book(300,"Made Easy") s.ShowVal() t.ShowVal() u.ShowVal() s.Assign(5, "Made ")</code></pre>                                                                                                                       |                                              |                                                 |                                              |  |  |                      |  |

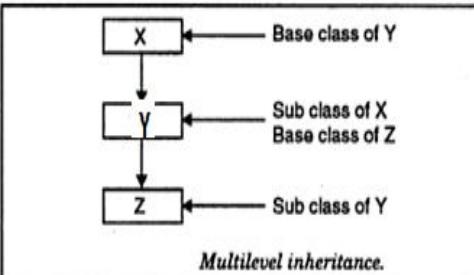
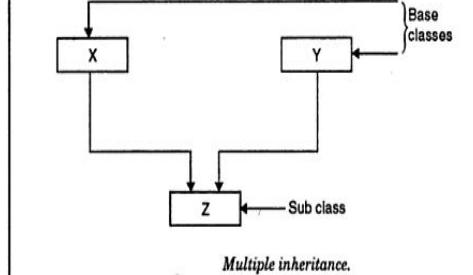
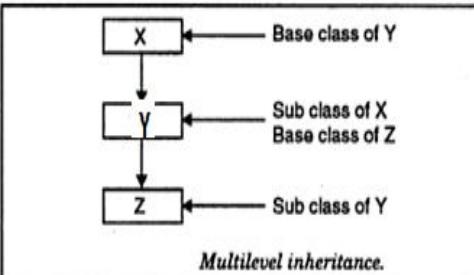
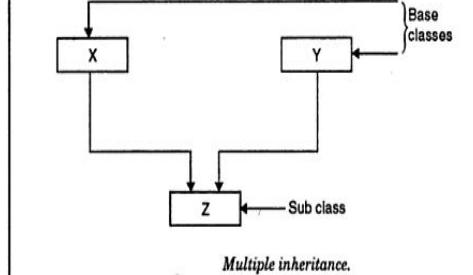
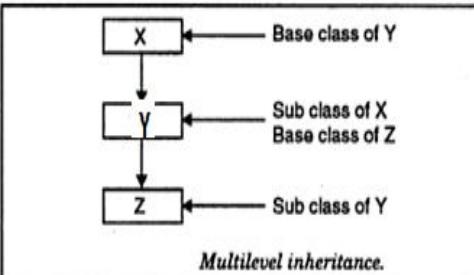
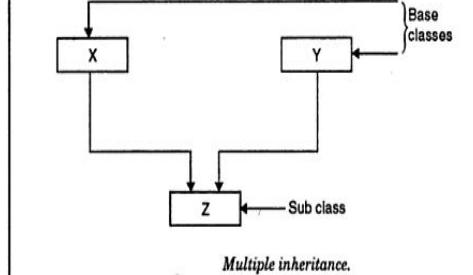
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(Sub Code: 083 Paper Code 91 Outside Delhi)

|                                                                                                                                                                                                   | <pre>t.Assign(15,"Easy ") u.Assign(25,"Made Easy") s.ShowVal() t.ShowVal() u.ShowVal()</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|--------------|----------------------|--------------|----------------------|-----------------|-------------------------|-------------------|---------------------------|-------------------|---------------------------|--------------------------|----------------------------------|----------------|----------|------------|-----|-------------------|--|--------|
| Ans                                                                                                                                                                                               | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">Python 2.7 output</th><th style="text-align: left; padding: 5px;">Other Versions output</th></tr> </thead> <tbody> <tr> <td style="padding: 5px;">100 # Python</td><td style="padding: 5px;">(100, '#', 'Python')</td></tr> <tr> <td style="padding: 5px;">200 # Python</td><td style="padding: 5px;">(200, '#', 'Python')</td></tr> <tr> <td style="padding: 5px;">300 # Made Easy</td><td style="padding: 5px;">(300, '#', 'Made Easy')</td></tr> <tr> <td style="padding: 5px;">105 # Made Python</td><td style="padding: 5px;">(105, '#', 'Made Python')</td></tr> <tr> <td style="padding: 5px;">215 # Easy Python</td><td style="padding: 5px;">(215, '#', 'Easy Python')</td></tr> <tr> <td style="padding: 5px;">325 # Made EasyMade Easy</td><td style="padding: 5px;">(325, '#', 'Made EasyMade Easy')</td></tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                               | Python 2.7 output | Other Versions output | 100 # Python | (100, '#', 'Python') | 200 # Python | (200, '#', 'Python') | 300 # Made Easy | (300, '#', 'Made Easy') | 105 # Made Python | (105, '#', 'Made Python') | 215 # Easy Python | (215, '#', 'Easy Python') | 325 # Made EasyMade Easy | (325, '#', 'Made EasyMade Easy') |                |          |            |     |                   |  |        |
| Python 2.7 output                                                                                                                                                                                 | Other Versions output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 100 # Python                                                                                                                                                                                      | (100, '#', 'Python')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 200 # Python                                                                                                                                                                                      | (200, '#', 'Python')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 300 # Made Easy                                                                                                                                                                                   | (300, '#', 'Made Easy')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 105 # Made Python                                                                                                                                                                                 | (105, '#', 'Made Python')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 215 # Easy Python                                                                                                                                                                                 | (215, '#', 'Easy Python')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| 325 # Made EasyMade Easy                                                                                                                                                                          | (325, '#', 'Made EasyMade Easy')                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| <i>(½ Mark for each correct line of output)</i>                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| <b>Note:</b>                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| <ul style="list-style-type: none"> <li>● Deduct ½ Mark for not writing any or all ‘#’ symbol(s)</li> <li>● Deduct ½ Mark for not considering any or all line breaks at proper place(s)</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| (f)                                                                                                                                                                                               | What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable PICKER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
|                                                                                                                                                                                                   | <pre>import random PICKER=random.randint(0,3) COLOR=["BLUE","PINK","GREEN","RED"]; for I in COLOR:     for J in range(1,PICKER):         print(I,end="")     print()</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
|                                                                                                                                                                                                   | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">(i)</th><th style="text-align: center; padding: 5px;">(ii)</th><th style="text-align: center; padding: 5px;">(iii)</th><th style="text-align: center; padding: 5px;">(iv)</th></tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">BLUE</td><td style="text-align: center; padding: 5px;">BLUE</td><td style="text-align: center; padding: 5px;">PINK</td><td style="text-align: center; padding: 5px;">BLUEBLUE</td></tr> <tr> <td style="text-align: center; padding: 5px;">PINK</td><td style="text-align: center; padding: 5px;">BLUEPINK</td><td style="text-align: center; padding: 5px;">PINKGREEN</td><td style="text-align: center; padding: 5px;">PINKPINK</td></tr> <tr> <td style="text-align: center; padding: 5px;">GREEN</td><td style="text-align: center; padding: 5px;">BLUERPINKGREEN</td><td style="text-align: center; padding: 5px;">GREENRED</td><td style="text-align: center; padding: 5px;">GREENGREEN</td></tr> <tr> <td style="text-align: center; padding: 5px;">RED</td><td style="text-align: center; padding: 5px;">BLUERPINKGREENRED</td><td></td><td style="text-align: center; padding: 5px;">REDRED</td></tr> </tbody> </table> |                   | (i)                   | (ii)         | (iii)                | (iv)         | BLUE                 | BLUE            | PINK                    | BLUEBLUE          | PINK                      | BLUEPINK          | PINKGREEN                 | PINKPINK                 | GREEN                            | BLUERPINKGREEN | GREENRED | GREENGREEN | RED | BLUERPINKGREENRED |  | REDRED |
| (i)                                                                                                                                                                                               | (ii)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (iii)             | (iv)                  |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| BLUE                                                                                                                                                                                              | BLUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | PINK              | BLUEBLUE              |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| PINK                                                                                                                                                                                              | BLUEPINK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PINKGREEN         | PINKPINK              |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| GREEN                                                                                                                                                                                             | BLUERPINKGREEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GREENRED          | GREENGREEN            |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| RED                                                                                                                                                                                               | BLUERPINKGREENRED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   | REDRED                |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |
| Ans                                                                                                                                                                                               | Option (i) and (iv) are possible<br><br>OR<br><br>Option (i) only<br><br>PICKER maxval=3 minval=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                       |              |                      |              |                      |                 |                         |                   |                           |                   |                           |                          |                                  |                |          |            |     |                   |  |        |

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|                                                                                                                                                     |                                                                                                                                                    | <p><b>(1 Mark for mentioning correct option(s))</b><br/> <b>Note:</b> No marks to be awarded for writing any other option.</p> <p><b>(½ Mark each for Minimum and Maximum Value of PICKER)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------|--|
| 2                                                                                                                                                   | (a)                                                                                                                                                | What is the difference between Multilevel and Multiple inheritance? Give suitable examples to illustrate both.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                      |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
|                                                                                                                                                     | Ans                                                                                                                                                | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">Multilevel inheritance</th> <th style="text-align: center; padding: 5px;">Multiple inheritance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 10px;">  <p style="text-align: center;"><i>Multilevel inheritance.</i></p> </td> <td style="text-align: center; padding: 10px;">  <p style="text-align: center;"><i>Multiple inheritance.</i></p> </td> </tr> <tr> <td style="text-align: center; padding: 5px;">X is the parent class of Y and Y is the parent class of Z</td> <td style="text-align: center; padding: 5px;">The child class Z has parents X and Y</td> </tr> </tbody> </table> | Multilevel inheritance | Multiple inheritance |  <p style="text-align: center;"><i>Multilevel inheritance.</i></p> |  <p style="text-align: center;"><i>Multiple inheritance.</i></p> | X is the parent class of Y and Y is the parent class of Z | The child class Z has parents X and Y |  |
| Multilevel inheritance                                                                                                                              | Multiple inheritance                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
|  <p style="text-align: center;"><i>Multilevel inheritance.</i></p> |  <p style="text-align: center;"><i>Multiple inheritance.</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
| X is the parent class of Y and Y is the parent class of Z                                                                                           | The child class Z has parents X and Y                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
|                                                                                                                                                     |                                                                                                                                                    | <p><b>( 1 mark for correct difference)</b><br/> <b>(1 mark for correct example)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |
|                                                                                                                                                     | (b)                                                                                                                                                | <p>What will be the output of the following python code considering the following set of inputs?</p> <p><b>AMAR</b><br/> <b>THREE</b><br/> <b>A123</b><br/> <b>1200</b></p> <p>Also, explain the try and except used in the code.</p> <pre style="font-family: monospace; font-size: 0.9em;"> Start=0 while True:     try:         Number=int(raw_input("Enter Number"))         break     except ValueError:         Start=Start+2 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                      |                      |                                                                                                                                                     |                                                                                                                                                    |                                                           |                                       |  |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre>        print("Re-enter an integer") print(Start)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |
| Ans | <p>Output:</p> <pre>Enter Number AMAR Re-enter an integer Enter Number THREE Re-enter an integer Enter Number A123 Re-enter an integer Enter Number 1200 6</pre> <p>Explanation: The code inside try makes sure that the valid number is entered by the user. When any input other than an integer is entered, a value error is thrown and it prompts the user to enter another value.</p>                                                                                                                                                                                                                                           |   |
|     | <p><i>(½ mark for correct output for text entry)</i><br/><i>(½ mark for correct output for number entry)</i><br/><i>(1 mark for correct explanation of try and except)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |
| (c) | Write a class CITY in Python with following specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 |
|     | <p>Instance Attributes</p> <ul style="list-style-type: none"><li>- Ccode # Numeric value</li><li>- CName # String value</li><li>- Pop # Numeric value for Population</li><li>- KM # Numeric value</li><li>- Density # Numeric value for Population Density</li></ul> <p>Methods:</p> <ul style="list-style-type: none"><li>- DenCal() # Method to calculate Density as Pop/KM</li><li>- Record() # Method to allow user to enter values Ccode,CName,Pop,KM and call DenCal() method</li><li>- View() # Method to display all the members also display a message "Highly Populated City" if the Density is more than 10000.</li></ul> |   |
| Ans | <pre>class CITY:     def __init__(self):         self.Ccode = 0         self.CName = ""         self.Pop = 0         self.KM = 0</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |

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```
    self.Density=0
def DenCal(self):
    self.Density = self.Pop / self.KM
def Record(self):
    self.Ccode = input("Enter CCode")
    self.CName = raw_input("Enter CName")
    self.Pop = input("Enter population")
    self.KM = input("Enter KM")
    DenCal(self) // or self.DenCal()
def View(self):
    print CCode,CName,Pop, KM, Density
    if self.Density > 10000:
        print("Highly populated city")
    # OR print("Highly populated city")
```

*(½ Mark for correct syntax for class header)  
(1 Mark for correct declaration of instance attributes)  
(½ Mark for correct definition of DenCal() function)  
(1 Mark for correct definition of Record() with proper invocation of DenCal() function)  
(1 Mark for correct definition of View())*

**NOTE:**

*Deduct ½ Mark if DenCal() is not invoked properly inside Record() function*

|     |                                                                              |   |
|-----|------------------------------------------------------------------------------|---|
| (d) | How do we implement abstract method in python? Give an example for the same. | 2 |
|-----|------------------------------------------------------------------------------|---|

**Ans** Abstract method: An unimplemented method is called an abstract method. When an abstract method is declared in a base class, the derived class has to either define the method or raise “NotImplementedError”

OR

Abstract Method can be used to enable parent class method execution.

```
class Shape(object):
    def findArea(self):
        pass
class Square(Shape):
    def __init__(self,side):
        self.side = side
def findArea(self):
    return self.side * self.side
```

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|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|-----------|-----------|-----------|-----------|----|--------|----|----|-----|-----------|----|----|--------|----|----|-----|----|----|-----------|--|
|        | <i>( 1 mark for correct explanation)<br/>( 1 mark for any correct example)</i>                                                                                                                                                                                                                                                                                                                                                                                                    |        |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| (e)    | What is the significance of super() method? Give an example for the same.                                                                                                                                                                                                                                                                                                                                                                                                         | 2      |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| Ans    | <p>super() function is used to call base class methods which has been extended in derived class.</p> <p>EX:</p> <pre>class GradStudent(Student):     def __init__(self):         super(GradStudent, self).__init__()         self.subject = ""         self.working = ""     def readGrad(self):         <u># Call readStudent method of parent class</u> <u>super(GradStudent, self).readStudent()</u></pre>                                                                     |        |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
|        | <i>( 1 mark for correct explanation)<br/>( 1 mark for correct example)</i>                                                                                                                                                                                                                                                                                                                                                                                                        |        |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| 3. (a) | <p>What will be the status of the following list after the First, Second and Third pass of the selection sort method used for arranging the following elements in descending order?</p> <p>Note: Show the status of all the elements after each pass very clearly underlining the changes.</p> <p>12, 14, -54, 64, 90, 24</p>                                                                                                                                                     | 3      |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| Ans    | <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: right;">Pass 1</td> <td>12</td> <td>14</td> <td>-54</td> <td>64</td> <td><u>90</u></td> <td>24</td> </tr> <tr> <td style="text-align: right;">Pass 2</td> <td>90</td> <td>14</td> <td>-54</td> <td><u>64</u></td> <td>12</td> <td>24</td> </tr> <tr> <td style="text-align: right;">Pass 3</td> <td>90</td> <td>64</td> <td>-54</td> <td>14</td> <td>12</td> <td><u>24</u></td> </tr> </table> | Pass 1 | 12  | 14        | -54       | 64        | <u>90</u> | 24 | Pass 2 | 90 | 14 | -54 | <u>64</u> | 12 | 24 | Pass 3 | 90 | 64 | -54 | 14 | 12 | <u>24</u> |  |
| Pass 1 | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14     | -54 | 64        | <u>90</u> | 24        |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| Pass 2 | 90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14     | -54 | <u>64</u> | 12        | 24        |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| Pass 3 | 90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 64     | -54 | 14        | 12        | <u>24</u> |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
|        | <i>( 1 mark for each correct pass)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |
| (b)    | For a given list of values in descending order, write a method in python to search for a value with the help of Binary Search method. The method should return position of the value and should return -1 if the value not present in the list.                                                                                                                                                                                                                                   | 2      |     |           |           |           |           |    |        |    |    |     |           |    |    |        |    |    |     |    |    |           |  |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Ans | <pre>def binarysrch(nums,x):     high = len(nums)     low = 0     while low &lt; high:         mid = (low + high)//2         midval = nums[mid]         if midval &gt; x:             low = mid + 1         elif midval &lt; x:             high = mid         else:             return mid     return -1</pre>                                                                                                                                                                                                                                                     |   |
|     | <p>(½ mark for assignment of high/ub and low/lb)<br/>(½ mark for appropriate looping condition)<br/>(½ mark for calculation of Mid)<br/>(½ mark for changing high/ub and low/lb)</p>                                                                                                                                                                                                                                                                                                                                                                                |   |
| (c) | Write Insert(City) and Delete(City) methods in python to add City and Remove City considering them to act as Insert and Delete operations of the data structure Queue.                                                                                                                                                                                                                                                                                                                                                                                              | 4 |
| Ans | <pre>class queue:     city = [ ]     def Insert(self):         a = raw_input("Enter city")         queue.city.append(a)     def Delete(self):         if (queue.city == [ ] ):             print "Queue empty"         else:             print "Deleted element is", queue.city[0]             queue.city.delete()</pre> <p>OR</p> <pre>class queue:     city = [ ]     def Insert(self):         a = raw_input("Enter city")         queue.a.append(a)     def Delete(self):         if (queue.city == [ ] ):             print("Queue empty")         else:</pre> |   |

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|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <pre style="margin: 0;">print("Deleted element is", queue.city[0]) queue.city.delete()</pre>                                                                                                                                                                                                                                                                                                                                                                                                 |   |
|     | <p>(½ mark insert header)<br/>         (½ mark for accepting a value from user)<br/>         (½ mark for adding value in list)<br/>         (½ mark for delete header)<br/>         (½ mark for checking empty list condition)<br/>         (½ mark for displaying “Empty Message”)<br/>         (½ mark for displaying the value to be deleted)<br/>         (½ mark for deleting value from list)</p>                                                                                      |   |
| (d) | Write a method in python to find and display the prime numbers between 2 to N.<br>Pass N as argument to the method.                                                                                                                                                                                                                                                                                                                                                                          | 3 |
| Ans | <pre style="margin: 0;">def prime(N) :     for a in range(2,N) :         Prime=1         for I in range(2,a) :             if a%i ==0 :                 Prime=0             if Prime==1 :                 print a</pre> <p>OR</p> <pre style="margin: 0;">def prime(N) :     for a in range(2,N) :         for I in range(2,a) :             if a%i ==0 :                 break             else :                 print a</pre> <p>OR</p> <p>Any other correct code performing the same</p> |   |
|     | <p>(½ mark function header)<br/>         (½ mark for outer loop)<br/>         (½ mark for inner loop)<br/>         (1 mark for divisibility check)<br/>         (½ mark for displaying prime number)</p>                                                                                                                                                                                                                                                                                     |   |
| (e) | Evaluate the following postfix notation of expression. Show status of stack after every operation.<br><br>$12, 2, /, 34, 20, -, +, 5, +$                                                                                                                                                                                                                                                                                                                                                     | 2 |

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| Ans     | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px;">Element</th><th style="padding: 2px;">Stack</th></tr> </thead> <tbody> <tr><td style="padding: 2px;">12</td><td style="padding: 2px;">12</td></tr> <tr><td style="padding: 2px;">2</td><td style="padding: 2px;">12, 2</td></tr> <tr><td style="padding: 2px;">/</td><td style="padding: 2px;">6</td></tr> <tr><td style="padding: 2px;">34</td><td style="padding: 2px;">6, 34</td></tr> <tr><td style="padding: 2px;">20</td><td style="padding: 2px;">6, 34, 20</td></tr> <tr><td style="padding: 2px;">-</td><td style="padding: 2px;">6, 14</td></tr> <tr><td style="padding: 2px;">+</td><td style="padding: 2px;">20</td></tr> <tr><td style="padding: 2px;">5</td><td style="padding: 2px;">20, 5</td></tr> <tr><td style="padding: 2px;">+</td><td style="padding: 2px;">25</td></tr> </tbody> </table> | Element | Stack | 12 | 12 | 2 | 12, 2 | / | 6 | 34 | 6, 34 | 20 | 6, 34, 20 | - | 6, 14 | + | 20 | 5 | 20, 5 | + | 25 |  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|----|----|---|-------|---|---|----|-------|----|-----------|---|-------|---|----|---|-------|---|----|--|
| Element | Stack                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 12      | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 2       | 12, 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| /       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 34      | 6, 34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 20      | 6, 34, 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| -       | 6, 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| +       | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 5       | 20, 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| +       | 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
|         | <b>Final Result = 25</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
|         | <i>(½ Mark for evaluation till each operator)</i><br><b>OR</b><br><i>(1 Mark for only writing the Final answer without showing stack status)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| 4 (a)   | Write a statement in Python to perform the following operations:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1       |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
|         | <ul style="list-style-type: none"> <li>• To open a text file “MYPET.TXT” in write mode</li> <li>• To open a text file “MYPET.TXT” in read mode</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| Ans     | <pre style="margin: 0;">• f1 = open("MYPET.TXT", 'w')</pre> <pre style="margin: 0;">f2 = open("MYPET.TXT", 'r')</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
|         | <i>( ½ Mark for each correct statement)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| (b)     | Write a method in python to write multiple line of text contents into a text file daynote.txt line.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2       |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
| Ans     | <pre style="margin: 0;">def writel():     f = open("daynote.txt",'w')     while True:         line = raw_input("Enter line")         f.write(line)         choice = raw_input("Are there more lines")         if choice == 'N':             break     f.close()</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |
|         | <p>Note: Using writelines() is also correct</p> <p><i>(½ Mark for opening file in appropriate mode)</i><br/> <i>(½ Mark for end of file check and loop)</i><br/> <i>(½ Mark for taking input from user)</i><br/> <i>(½ Mark for writing the line into the file)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |       |    |    |   |       |   |   |    |       |    |           |   |       |   |    |   |       |   |    |  |

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| <p>(c)</p>                                         | <p>Consider the following definition of class Employee, write a method in python to search and display the content in a pickled file emp.dat, where Empno is matching with 'A0005'.</p> <pre style="font-family: monospace; margin-left: 20px;"> <b>class Employee:</b>     <b>def __init__(self,E,NM):</b>         <b>self.Empno=E</b>         <b>self.EName=NM</b>      <b>def Display(self):</b>         <b>print(self.Empno, " - ", self.EName)</b> </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>3</p>     |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------|--|-----|------|-----------|-----------|---|-------------------|------|---------|---|---------------|------|--------------|---|-------------|--|--|--|
| <p>Ans</p>                                         | <pre style="font-family: monospace; margin-left: 20px;"> <b>def search():</b>     <b>f = open("emp.dat", 'rb')</b>     <b>try:</b>         <b>while True:</b>             <b>e = pickle.load(f)</b>             <b>if e.Empno == 'A0005':</b>                 <b>e.display()</b>     <b>except EOFError:</b>         <b>pass</b>     <b>f.close()</b> </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
|                                                    | <p><i>(½ Mark for correct function header)<br/> (½ Mark for opening the file emp.dat correctly)<br/> (½ Mark for correct file check and loop)<br/> (½ Mark for correct load())<br/> (½ Mark for correct checking of Empno)<br/> (½ Mark for displaying the record)</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| <p><b>SECTION C - (For all the candidates)</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| <p>5 (a)</p>                                       | <p>Observe the following PARTICIPANTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in RESULT ? Also, find the Degree and Cardinality of the result.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>2</p>     |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
|                                                    | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center; padding-bottom: 5px;">PARTICIPANTS</th> <th colspan="2" style="text-align: center; padding-bottom: 5px;">EVENTS</th> </tr> <tr> <th style="text-align: center; border: 1px solid black; padding: 2px;">PNO</th> <th style="text-align: center; border: 1px solid black; padding: 2px;">NAME</th> <th style="text-align: center; border: 1px solid black; padding: 2px;">EVENTCODE</th> <th style="text-align: center; border: 1px solid black; padding: 2px;">EVENTNAME</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">1</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">Aruanabha Tariban</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">1001</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">IT Quiz</td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">2</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">John Fedricks</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">1002</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">Group Debate</td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">3</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">Kanti Desai</td> <td></td> <td></td> </tr> </tbody> </table> | PARTICIPANTS |              | EVENTS |  | PNO | NAME | EVENTCODE | EVENTNAME | 1 | Aruanabha Tariban | 1001 | IT Quiz | 2 | John Fedricks | 1002 | Group Debate | 3 | Kanti Desai |  |  |  |
| PARTICIPANTS                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | EVENTS       |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| PNO                                                | NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EVENTCODE    | EVENTNAME    |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| 1                                                  | Aruanabha Tariban                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1001         | IT Quiz      |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| 2                                                  | John Fedricks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1002         | Group Debate |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |
| 3                                                  | Kanti Desai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |              |        |  |     |      |           |           |   |                   |      |         |   |               |      |              |   |             |  |  |  |

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| <b>RESULT</b> |     |                   |           |              |  |
|---------------|-----|-------------------|-----------|--------------|--|
|               | PNO | NAME              | EVENTCODE | EVENTNAME    |  |
|               | 1   | Aruanabha Tariban | 1001      | IT Quiz      |  |
|               | 1   | Aruanabha Tariban | 1002      | Group Debate |  |
|               | 2   | John Fedricks     | 1001      | IT Quiz      |  |
|               | 2   | John Fedricks     | 1002      | Group Debate |  |
|               | 3   | Kanti Desai       | 1001      | IT Quiz      |  |
|               | 3   | Kanti Desai       | 1002      | Group Debate |  |

|     |                                                                                                                                                                                                                                       |          |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Ans | <b>Cartesian Product</b><br><br>Degree = 4<br>Cardinality = 6<br><br><i>(1 Mark for writing the correct name of RDBMS operation)</i><br><i>(½ Mark for writing correct degree)</i><br><i>(½ Mark for writing correct cardinality)</i> |          |
| (b) | Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables                                                                                                                       | <b>6</b> |

| Table: VEHICLE |               |       |  |  |  |
|----------------|---------------|-------|--|--|--|
| VCODE          | VEHICLETYPE   | PERKM |  |  |  |
| v01            | VOLVO BUS     | 150   |  |  |  |
| v02            | AC DELUXE BUS | 125   |  |  |  |
| v03            | ORDINARY BUS  | 80    |  |  |  |
| v05            | SUV           | 30    |  |  |  |
| v04            | CAR           | 18    |  |  |  |

Note: PERKM is Freight Charges per kilometer

| Table: TRAVEL |              |            |     |       |     |
|---------------|--------------|------------|-----|-------|-----|
| CNO           | CNAME        | TRAVELDATE | KM  | VCODE | NOP |
| 101           | K.Niwal      | 2015-12-13 | 200 | v01   | 32  |
| 103           | Fredrick Sym | 2016-03-21 | 120 | v03   | 45  |
| 105           | Hitesh Jain  | 2016-04-23 | 450 | v02   | 42  |
| 102           | Ravi Anish   | 2016-01-13 | 80  | v02   | 40  |
| 107           | John Malina  | 2015-02-10 | 65  | v04   | 2   |
| 104           | Sahanubhuti  | 2016-01-28 | 90  | v05   | 4   |
| 106           | Ramesh Jaya  | 2016-04-06 | 100 | v01   | 25  |

Note:

- Km is Kilometers travelled
- NOP is number of passengers travelled in vehicle

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|  |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|--|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | (i)   | To display CNO, CNAME, TRAVELDATE from the table TRAVEL in descending order of CNO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|  | Ans   | <pre>SELECT CNO, CNAME, TRAVELDATE FROM TRAVEL ORDER BY CNO DESC;</pre> <p><i>(½ Mark for SELECT CNO, CNAME, TRAVELDATE FROM TRAVEL)</i><br/> <i>(½ Mark for ORDER BY CNO DESC)</i></p>                                                                                                                                                                                                                                                                                                                                                                  |  |
|  | (ii)  | To display the CNAME of all the customers from the table TRAVEL who are traveling by vehicle with code V01 or V02.                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
|  | Ans   | <pre>SELECT CNAME FROM TRAVEL WHERE VCODE='V01' OR VCODE='V02';</pre> <p>OR</p> <pre>SELECT CNAME FROM TRAVEL WHERE VCODE IN ('V01', 'V02');</pre> <p><i>(½ Mark for correct SELECT)</i><br/> <i>(½ Mark for correct WHERE clause)</i></p>                                                                                                                                                                                                                                                                                                               |  |
|  | (iii) | To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'.                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|  | Ans   | <pre>SELECT CNO, CNAME from TRAVEL WHERE TRAVELDATE &gt;= '2015-05-01' AND TRAVELDATE &lt;= '2015-12-31';</pre> <p>OR</p> <pre>SELECT CNO, CNAME from TRAVEL WHERE TRAVELDATE BETWEEN '2015-05-01' AND '2015-12-31';</pre> <p>OR</p> <pre>SELECT CNO, CNAME from TRAVEL WHERE TRAVELDATE &lt;= '2015-12-31' AND TRAVELDATE &gt;= '2015-05-01';</pre> <p>OR</p> <pre>SELECT CNO, CNAME from TRAVEL WHERE TRAVELDATE BETWEEN '2015-12-31' AND '2015-05-01';</pre> <p><i>(½ Mark for correct SELECT)</i><br/> <i>(½ Mark for correct WHERE clause )</i></p> |  |
|  | (iv)  | To display all the details from table TRAVEL for the customers, who have travel distance more than 120 KM in ascending order of NOP.                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|  | Ans   | <pre>SELECT * FROM TRAVEL WHERE KM &gt; 120 ORDER BY NOP;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |

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|                       |                 | <i>(½ Mark for correct SELECT)<br/>(½ Mark for correct WHERE clause )</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                 |                    |      |            |               |     |             |     |  |
|-----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|--------------------|------|------------|---------------|-----|-------------|-----|--|
|                       | (v)             | <code>SELECT COUNT(*), VCODE FROM TRAVEL<br/>GROUP BY VCODE HAVING COUNT(*)&gt;1;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                 |                    |      |            |               |     |             |     |  |
|                       | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>COUNT (*)</u></th> <th style="text-align: left;"><u>VCODE</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">2</td> <td style="text-align: left;">V01</td> </tr> <tr> <td style="text-align: left;">2</td> <td style="text-align: left;">V02</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i>                                                                                                                                                              | <u>COUNT (*)</u>      | <u>VCODE</u>    | 2                  | V01  | 2          | V02           |     |             |     |  |
| <u>COUNT (*)</u>      | <u>VCODE</u>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| 2                     | V01             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| 2                     | V02             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
|                       | (vi)            | <code>SELECT DISTINCT VCODE FROM TRAVEL;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
|                       | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>DISTINCT VCODE</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">V01</td> </tr> <tr> <td style="text-align: left;">V02</td> </tr> <tr> <td style="text-align: left;">V03</td> </tr> <tr> <td style="text-align: left;">V04</td> </tr> <tr> <td style="text-align: left;">V05</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i>                                                                                                                             | <u>DISTINCT VCODE</u> | V01             | V02                | V03  | V04        | V05           |     |             |     |  |
| <u>DISTINCT VCODE</u> |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| V01                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| V02                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| V03                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| V04                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| V05                   |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
|                       | (vii)           | <code>SELECT A.VCODE, CNAME, VEHICLETYPE<br/>FROM TRAVEL A, VEHICLE B<br/>WHERE A.VCODE=B.VCODE AND KM&lt;90;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                 |                    |      |            |               |     |             |     |  |
|                       | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>VCODE</u></th> <th style="text-align: left;"><u>CNAME</u></th> <th style="text-align: left;"><u>VEHICLETYPE</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">V02</td> <td style="text-align: left;">Ravi Anish</td> <td style="text-align: left;">AC DELUXE BUS</td> </tr> <tr> <td style="text-align: left;">V04</td> <td style="text-align: left;">John Malina</td> <td style="text-align: left;">CAR</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i> | <u>VCODE</u>          | <u>CNAME</u>    | <u>VEHICLETYPE</u> | V02  | Ravi Anish | AC DELUXE BUS | V04 | John Malina | CAR |  |
| <u>VCODE</u>          | <u>CNAME</u>    | <u>VEHICLETYPE</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |                 |                    |      |            |               |     |             |     |  |
| V02                   | Ravi Anish      | AC DELUXE BUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                 |                    |      |            |               |     |             |     |  |
| V04                   | John Malina     | CAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                 |                    |      |            |               |     |             |     |  |
|                       | (viii)          | <code>SELECT CNAME, KM*PERKM<br/>FROM TRAVEL A, VEHICLE B<br/>WHERE A.VCODE=B.VCODE AND A.VCODE='V05';</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                 |                    |      |            |               |     |             |     |  |
|                       | Ans             | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>CNAME</u></th> <th style="text-align: left;"><u>KM*PERKM</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Sahanubhuti</td> <td style="text-align: left;">2700</td> </tr> </tbody> </table> <i>(½ Mark for correct output)</i>                                                                                                                                                                                                                                           | <u>CNAME</u>          | <u>KM*PERKM</u> | Sahanubhuti        | 2700 |            |               |     |             |     |  |
| <u>CNAME</u>          | <u>KM*PERKM</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| Sahanubhuti           | 2700            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                 |                    |      |            |               |     |             |     |  |
| 6                     | a.              | Verify the following using Boolean Laws.<br>$X' + Y' Z = X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z' + X' \cdot Y \cdot Z + X' \cdot Y' \cdot Z + X \cdot Y' \cdot Z$                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                     |                 |                    |      |            |               |     |             |     |  |
|                       | Ans             | <p>LHS</p> $  \begin{aligned}  & X' + Y' \cdot Z \\  & = X' \cdot (Y + Y') \cdot (Z + Z') + (X + X') \cdot Y' \cdot Z  \end{aligned}  $                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |                 |                    |      |            |               |     |             |     |  |

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$$\begin{aligned}
 &= X' \cdot Y \cdot Z + X' \cdot Y \cdot Z' + X' \cdot Y' \cdot Z + X' \cdot Y' \cdot Z' + X \cdot Y' \cdot Z + X' \cdot Y' \cdot Z \\
 &= X' \cdot Y \cdot Z + X' \cdot Y \cdot Z' + X' \cdot Y' \cdot Z + X' \cdot Y' \cdot Z' + X \cdot Y' \cdot Z \\
 &= X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z' + X' \cdot Y \cdot Z + X' \cdot Y' \cdot Z + X \cdot Y' \cdot Z \\
 &= \text{RHS}
 \end{aligned}$$

**OR**

**RHS**

$$\begin{aligned}
 &X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z' + X' \cdot Y \cdot Z + X' \cdot Y' \cdot Z + X \cdot Y' \cdot Z \\
 &= X' \cdot Y' \cdot Z + X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z + X' \cdot Y \cdot Z' + X \cdot Y' \cdot Z \\
 &= X' \cdot Y' \cdot (Z+Z') + X' \cdot Y \cdot (Z+Z') + X \cdot Y' \cdot Z \\
 &= X' \cdot Y' + X' \cdot Y + X \cdot Y' \cdot Z \\
 &= X' \cdot (Y'+Y) + X \cdot Y' \cdot Z \\
 &= X' + X \cdot Y' \cdot Z \\
 &= (X' + X) \cdot (X' + Y' \cdot Z) \\
 &= X' + Y' \cdot Z \\
 &= \text{LHS}
 \end{aligned}$$

*(2 Marks for correct Verification)*

**OR**

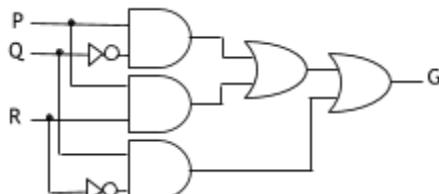
*(1 Mark for expanding LHS up to 1 correct step)*

**OR**

*(1 Mark for reducing RHS up to 1 correct step)*

- b.** Write the Boolean Expression for the result of the Logic Circuit as shown below:

2



**Ans**  $P \cdot Q' + P \cdot R + Q \cdot R'$

*(2 Marks for correctly writing the full expression )*

**OR**

*(½ Mark each for correctly writing any one term)*

- c.** Derive a Canonical SOP expression for a Boolean function G, represented by the following truth table:

1

| A | B | C | G(A, B, C) |
|---|---|---|------------|
| 0 | 0 | 0 | 1          |
| 0 | 0 | 1 | 0          |

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|   |   |   |   |
|---|---|---|---|
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

**Ans**

$$G(A, B, C) = A' \cdot B' \cdot C' + A' \cdot B \cdot C' + A \cdot B \cdot C' + A \cdot B \cdot C$$

OR

$$G(A, B, C) = \Sigma(0, 2, 6, 7)$$

*(1 Mark for correctly writing the SOP form)*

**Note:** Deduct  $\frac{1}{2}$  mark if wrong variable names are written in the expression

**(d)**

Reduce the following Boolean Expression to its simplest form using K-Map:

**3**

$$F(P, Q, R, S) = \Sigma(0, 4, 5, 8, 9, 10, 11, 12, 13, 15)$$

|      | P'Q'   | P'Q    | PQ      | PQ'     |
|------|--------|--------|---------|---------|
| R'S' | 1<br>0 | 1<br>4 | 1<br>12 | 1<br>8  |
| R'S  | 1      | 1<br>5 | 1<br>13 | 1<br>9  |
| RS   | 3      | 7      | 1<br>15 | 1<br>11 |
| RS'  | 2      | 6      | 14      | 1<br>10 |

OR

|      | R'S'    | R'S     | RS      | RS'     |
|------|---------|---------|---------|---------|
| P'Q' | 1<br>0  |         | 1<br>3  | 2       |
| P'Q  | 1<br>4  | 1<br>5  | 7       | 6       |
| PQ   | 1<br>12 | 1<br>13 | 1<br>15 | 14      |
| PQ'  | 1<br>8  | 1<br>9  | 1<br>11 | 1<br>10 |

$$F(P, Q, R, S) = R'S' + PQ' + QR' + PS$$

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|                                                                                                                                                             |                                                                                                                        | <p style="text-align: center;"><b>( ½ Mark for drawing K-Map with correct variable names)<br/>( ½ Mark each for 4 groupings)<br/>( ½ Mark for writing final expression in reduced/minimal form)</b></p>                                                                                                                                                                                                                                                                                                                                                                          |                             |                          |                                                                                              |                                                                                                                        |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--|
| <p style="text-align: center;"><b>Note: Deduct ½ mark if wrong variable names are used</b></p>                                                              |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
| 7                                                                                                                                                           | (a)                                                                                                                    | Differentiate between PAN and LAN types of networks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1                           |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | Ans                                                                                                                    | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">PAN - Personal Area Network</th> <th style="text-align: center; padding: 5px;">LAN - Local Area Network</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">A personal area network - PAN - is a computer network organized around an individual person.</td> <td style="padding: 5px;">LAN interconnects a high number of access or node points or stations within a confined physical area upto a kilometer.</td> </tr> </tbody> </table> | PAN - Personal Area Network | LAN - Local Area Network | A personal area network - PAN - is a computer network organized around an individual person. | LAN interconnects a high number of access or node points or stations within a confined physical area upto a kilometer. |  |
| PAN - Personal Area Network                                                                                                                                 | LAN - Local Area Network                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
| A personal area network - PAN - is a computer network organized around an individual person.                                                                | LAN interconnects a high number of access or node points or stations within a confined physical area upto a kilometer. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
| <p style="text-align: center;"><b>(1 mark for one correct point of difference)<br/>OR<br/>(1 mark for Any other correct difference for PAN and LAN)</b></p> |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | (b)                                                                                                                    | Which protocol helps us to transfer files to and from a remote computer?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                           |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | Ans                                                                                                                    | FTP OR Telnet OR TCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |                          |                                                                                              |                                                                                                                        |  |
| <p style="text-align: center;"><b>(1 Mark for any one correct protocol name)</b></p>                                                                        |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | (c)                                                                                                                    | Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services?                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                           |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | Ans                                                                                                                    | <p>Speed -</p> <ul style="list-style-type: none"> <li>● Faster web browsing</li> <li>● Faster file transfer</li> </ul> <p>Service -</p> <ul style="list-style-type: none"> <li>● Better video clarity</li> <li>● Better security</li> </ul> <p>OR</p> <p>(Any other correct advantage can be considered)</p>                                                                                                                                                                                                                                                                     |                             |                          |                                                                                              |                                                                                                                        |  |
| <p style="text-align: center;"><b>(½ Mark for each of any one point for Speed/Service)</b></p>                                                              |                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | (d)                                                                                                                    | Write two characteristics of Web 2.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                           |                          |                                                                                              |                                                                                                                        |  |
|                                                                                                                                                             | Ans                                                                                                                    | <ul style="list-style-type: none"> <li>● Makes web more interactive through online social medias</li> <li>● Supports easy online information exchange</li> <li>● Interoperability on the internet</li> <li>● Video sharing possible in the websites</li> </ul>                                                                                                                                                                                                                                                                                                                   |                             |                          |                                                                                              |                                                                                                                        |  |

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|                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----|--|
|                                                                                                                         | <b>OR</b><br>Any two of the above or any other two correct characteristics of Web 2.0<br><i>(½ Mark each for any two correct answers)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| <b>(e)</b>                                                                                                              | What is the basic difference between Computer Worm and Trojan Horse?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1                   |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| <b>Ans</b>                                                                                                              | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px; width: 50%;">Trojan Horse</td><td style="padding: 5px; width: 50%;">Computer Worm</td></tr> <tr> <td style="padding: 5px;">It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them.</td><td style="padding: 5px;">It is a self-replicating computer program which uses a network to send copies of itself to other computers on the network and it may do so without any user intervention.</td></tr> </table> | Trojan Horse        | Computer Worm       | It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them. | It is a self-replicating computer program which uses a network to send copies of itself to other computers on the network and it may do so without any user intervention. |             |     |  |
| Trojan Horse                                                                                                            | Computer Worm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them. | It is a self-replicating computer program which uses a network to send copies of itself to other computers on the network and it may do so without any user intervention.                                                                                                                                                                                                                                                                                                                                                                                                      |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
|                                                                                                                         | <b>OR</b><br>Any other correct difference between Trojan Horse and Computer Worm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
|                                                                                                                         | <b>(1 Mark for writing correct difference between Trojan Horse and Computer Worm)</b><br><b>OR</b><br><b>(½ Mark each for writing correct explanation of Trojan Horse / Computer Worm)</b>                                                                                                                                                                                                                                                                                                                                                                                     |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| <b>(f)</b>                                                                                                              | Categories the following under Client side and Server Side script category?<br>(i) Java Script<br>(ii) ASP<br>(iii) VB Script<br>(iv) JSP                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                   |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| <b>Ans</b>                                                                                                              | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px; width: 50%;">Client Side Scripts</td><td style="padding: 5px; width: 50%;">Server Side Scripts</td></tr> <tr> <td style="padding: 5px;">VB Script</td><td style="padding: 5px;">ASP</td></tr> <tr> <td style="padding: 5px;">Java Script</td><td style="padding: 5px;">JSP</td></tr> </table>                                                                                                                                                                                 | Client Side Scripts | Server Side Scripts | VB Script                                                                                                               | ASP                                                                                                                                                                       | Java Script | JSP |  |
| Client Side Scripts                                                                                                     | Server Side Scripts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| VB Script                                                                                                               | ASP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| Java Script                                                                                                             | JSP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
|                                                                                                                         | <b>(1 Mark for correct answer)</b><br><b>OR</b><br><b>(½ Mark for any two correct client/server side script names)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |
| <b>(g)</b>                                                                                                              | Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as                                                                                                                                                                                                                                        |                     |                     |                                                                                                                         |                                                                                                                                                                           |             |     |  |

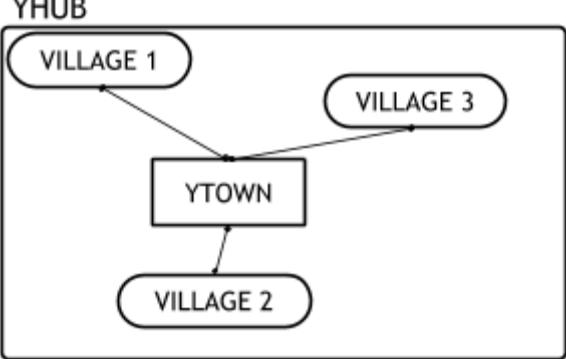
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|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------|--------------------|--------|--------------------|------|------------------------|--------|------------------------|--------|------------------------|--------|--------------------------|-------|--|
|                          | <p>follows.</p> <p>As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (iv), keeping in mind the distances between various locations and other given parameters.</p>                                                                                                                                                                                                                                                                                                                                                  |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|                          | <pre> graph LR     XCITY[XCITY] --&gt; HeadOffice[Head Office]     YHUB[YHUB] --&gt; V1((VILLAGE 1))     YHUB --&gt; YTOWN[YTOWN]     YHUB --&gt; V2((VILLAGE 2))     V3((VILLAGE 3)) --- YHUB   </pre>                                                                                                                                                                                                                                                                                                                                                                                      |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|                          | <p>Shortest distances between various locations:</p> <table border="1"> <tbody> <tr> <td>VILLAGE 1 to YTOWN</td> <td>2 KM</td> </tr> <tr> <td>VILLAGE 2 to YTOWN</td> <td>1.5 KM</td> </tr> <tr> <td>VILLAGE 3 to YTOWN</td> <td>3 KM</td> </tr> <tr> <td>VILLAGE 1 to VILLAGE 2</td> <td>3.5 KM</td> </tr> <tr> <td>VILLAGE 1 to VILLAGE 3</td> <td>4.5 KM</td> </tr> <tr> <td>VILLAGE 2 to VILLAGE 3</td> <td>3.5 KM</td> </tr> <tr> <td>CITY Head Office to YHUB</td> <td>30 Km</td> </tr> </tbody> </table>                                                                              | VILLAGE 1 to YTOWN | 2 KM | VILLAGE 2 to YTOWN | 1.5 KM | VILLAGE 3 to YTOWN | 3 KM | VILLAGE 1 to VILLAGE 2 | 3.5 KM | VILLAGE 1 to VILLAGE 3 | 4.5 KM | VILLAGE 2 to VILLAGE 3 | 3.5 KM | CITY Head Office to YHUB | 30 Km |  |
| VILLAGE 1 to YTOWN       | 2 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 2 to YTOWN       | 1.5 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 3 to YTOWN       | 3 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 1 to VILLAGE 2   | 3.5 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 1 to VILLAGE 3   | 4.5 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 2 to VILLAGE 3   | 3.5 KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| CITY Head Office to YHUB | 30 Km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|                          | <p>Number of Computers installed at various locations are as follows:</p> <table border="1"> <tbody> <tr> <td>YTOWN</td> <td>100</td> </tr> <tr> <td>VILLAGE 1</td> <td>10</td> </tr> <tr> <td>VILLAGE 2</td> <td>15</td> </tr> <tr> <td>VILLAGE 3</td> <td>15</td> </tr> <tr> <td>CITY OFFICE</td> <td>5</td> </tr> </tbody> </table> <p>Note:<br/>In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.</p> <p>The organization has got financial support from the government and top IT companies.</p> | YTOWN              | 100  | VILLAGE 1          | 10     | VILLAGE 2          | 15   | VILLAGE 3              | 15     | CITY OFFICE            | 5      |                        |        |                          |       |  |
| YTOWN                    | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 1                | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 2                | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| VILLAGE 3                | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
| CITY OFFICE              | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|                          | <p>(i) Suggest the most appropriate location of the SERVER in the YHUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                  |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |
|                          | <p><b>Ans</b> YTOWN</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |      |                    |        |                    |      |                        |        |                        |        |                        |        |                          |       |  |

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|     |                                                                                                                                                                      |   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|     | <p>Justification</p> <ul style="list-style-type: none"><li>• Since it has the maximum number of computers.</li><li>• It is closest to all other locations.</li></ul> |   |
|     | <p><i>(½ Mark for correct answer)</i><br/><i>(½ Mark for any one correct justification)</i></p>                                                                      |   |
|     | <p>(ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.</p>                 | 1 |
| Ans | <p>Optical Fiber</p>                                                                |   |
|     | <p><i>(½ Mark for correct wired medium)</i><br/><i>(½ mark for correct topology)</i></p>                                                                             |   |
|     | <p>(iii) Which hardware device will you suggest to connect all the computers within each location of YHUB?</p>                                                       | 1 |
| Ans | <p>Switch OR Hub</p> <p><i>(1 Mark for correct answer)</i></p>                                                                                                       |   |
|     | <p>(iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at YHUB locations?</p>                       | 1 |
| Ans | <p>Videoconferencing OR VoIP OR any other correct service/protocol</p> <p><i>(1 Mark for writing any one of the above answers)</i></p>                               |   |

| Ans | S.No. | Control/s              |
|-----|-------|------------------------|
|     | 1     | TextField              |
|     | 2     | ComboBox / RadioButton |
|     | 3     | ComboBox / RadioButton |
|     | 4     | TextArea               |

*(1/2 mark for each correct control)*

# COMPUTER SCIENCE

*Time allowed : 3 hours*

*Maximum Marks : 70*

**Instructions:**

- (i) All questions are compulsory.
- (ii) Programming Language: Section A refers to C++
- (iii) Programming Language: Section B refers to Python.
- (iv) Attempt either Section A or Section B.
- (v) Section C is compulsory for all.
- (vi) It is compulsory to mention 'Section A' or 'Section B' before attempting the question paper.

## QUESTION PAPER CODE 91/1

### Section-A

**(Only for C++ Candidates)**

1. (a) Find the correct identifiers out of the following, which can be used for naming variable, constants or functions in a C++ program: 2

While, for, Float, new, 2ndName, A%B, Amount2, \_Counter

- (b) Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully: 1

```
typedef char TEXT [80];
```

```
void main ()
```

```
{
```

```
TEXT Str[ ] = "Peace is supreme";
```

```
int Index=0;
```

```

while (Str[Index] != '\0')

    if (isupper(Str[Index]")

        Str[Index++] = '#';

    else

        Str[Index++] = '*';

    puts (Str);

}

```

- (c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. 2

Note: Assume all required header files are "already being included in the program.

```
#Define float Max=70.0;
```

```
Void main()
```

```
{
```

```
    int Speed
```

```
    char Stop='N';
```

```
    cin>>Speed;
```

```
    if Speed>Max
```

```
        Stop='Y';
```

```
        cout<<Stop<<end;
```

```
}
```

- (d) Write the output of the following C++ program code: 2

Note : Assume all required header files are already being included in the program.

```

void Position(int &C1, int C2=3)

{
    C1+=2;

    C2+=Y;

}

void main()

{
    int P1=20, P2=4;

    Position(P1);

    cout<<P1<<" , "<<P2<<endl;

    Position(P2,P1);

    cout<<P1<<" , "<<P2<<endl;

}

```

- (e) Write the output of the following C++ program code: 3

Note: Assume all required header files are already being included in the program.

```

class Calc

{
    char Grade;

    int Bonus;

public:

    Calc() {Grade='E';Bonus=0; }

    void Down(int G)

{

```

```

Grade-=G;

}

Void Up (int G)

{
    Grade+=G;

    Bonus++;

}

void Show()

{
    cout<<Grade<<"#"<<Bonus<<endl;

}

void main()

{
    Calc c;

    C.Down(2);

    C. Show();

    C.Up(7);

    C.Show();

    C.Down(2);

    C. Show();

}

```

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable NVM.

Note:

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n - 1.

```
void main()

{
    randomize();

    int NOM;

    NOM=random(3)+2;

    char TEXT[ ]="ABCDEFGHIJK";

    for (int I=1; I<=NOM; I++)

    {
        for(int J=NUM; J<=7; J++)
            cout<<TEXT[J];

        cout<<endl;
    }
}

(i) FGHI      (ii) BCDEFGH   (iii) EFGH     (iv) CDEFGH

FGHI          BCDEFGH          EFGH          CDEFGH

FGHI          EFGH

FGHI          EFGH
```

2. (a) What is a copy constructor? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.
- (b) Observe the following C++ code and answer the questions (i) and (ii) :

2

```

class Traveller
{
    long PNR;
    char TName[20];

public :
    Traveller() //Function 1
    {cout<<"Ready"<<endl; }

    void Book(long P,char N[]) //Function 2
    {PNR = P; strcpy(TName, N);}

    void Print() //Function 3
    {cout<<PNR << TName <<endl; }

    ~Traveller() //Function 4
    {cout<<"Booking cancelled1 "<<endl; }

};


```

- (i) Fill in the blank: statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code:

1

```

void main()
{
    Traveller T;
    _____ //Line 1
    _____ //Line 2
} //Stops here

```

- (ii) Which function will be executed at l//Stops here? What is this function referred as ?

1

(c) Write the definition of a class PIC in C++ with following description:

4

Private Members

- Pno //Data member for Picture Number (an integer)
- Category//Data member for Picture Category (a string)
- Location//Data member for Exhibition Location (a string)
- FixLocation //A member function to assign

//Exhibition Location as per category

//as shown in the following table

| Category | Location   |
|----------|------------|
| Classic  | Amina      |
| Modern   | Jim Plaq   |
| Antique  | Ustad Khan |

Public Members

- Enter() //A function to allow user to enter values  
//Pno, category and call FixLocation() function
- SeeAll() //A function to display all the data members

(d) Answer the questions (i) to (iv) based on the following:

4

class Exterior

{

    int OrderId;

    char Address[20];

protected:

    float Advance;

```

public:
    Exterior();
    void Book(); void View();
};

class Paint:public Exterior
{
    int WallArea,ColorCode;

protected:
    char Type;

public:
    Paint ();
    void PBook();
    void PView();
};

class Bill : public Paint
{
    float Charges;
    void Calculate();

public :
    Bill ();
    void Billing ();
    void Print ();
};


```

- (i) Which type of Inheritance out of the following is illustrated in the above example?
- Single Level Inheritance
  - Multi Level Inheritance
  - Multiple Inheritance
- (ii) Write the names of all the data members, which are directly accessible from the member functions of class Paint.
- (iii) Write the names of all the member functions, which are directly accessible from an object of class Bill.
- (iv) What will be the order of execution of the constructors, when an object of class Bill is declared ?
3. (a) Write the definition of a function Alter(int A[], int N) in C++, which should change all the multiples of 5 in the array to 5 and rest of the elements as 0.  
For example, if an array of 10 integers is as follows:

2

| A[0] | A[1] | A[2] | A[3] | A[4] | A[5] | A[6] | A[7] | A[8] | A[9] |
|------|------|------|------|------|------|------|------|------|------|
| 55   | 43   | 20   | 16   | 39   | 90   | 83   | 40   | 48   | 25   |

After executing the function, the array content should be changed as follows:

| A[0] | A[1] | A[2] | A[3] | A[4] | A[5] | A[6] | A[7] | A[8] | A[9] |
|------|------|------|------|------|------|------|------|------|------|
| 5    | 0    | 5    | 0    | 0    | 5    | 0    | 5    | 0    | 5    |

- (b) A two dimensional array P[20][50] is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element P[10][30], if the element P[5][5] is stored at the memory location 15000.  
3
- (c) Write the definition of a member function Pop() in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already included in the program.  
4

```
struct TEXTBOOKS
```

```
{
```

```

char ISBN[20]; char TITLE[80];

TEXTBOOKS *Link;

};

class STACK

{

    TEXTBOOKS *Top;

public:

    STACK() {Top=NULL; }

    void Push();

    void pope();

    ~STACK();

};

```

- (d) Write a function REVCOL (int P[] [5], int N, int M) in C++ to display the content of a two dimensional array, with each column content in reverse order.

3

Note: Array may contain any number of rows.

For example, if the content of array is as follows:

|    |    |    |    |    |
|----|----|----|----|----|
| 15 | 12 | 56 | 45 | 51 |
| 13 | 91 | 92 | 87 | 63 |
| 11 | 23 | 61 | 46 | 81 |

The function should display output as :

```

11   23   61   46   81

13   91   92   87   63

15   12   56   45   51

```

- (e) Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.

2

x / y + u\* (V-W)

4. (a) Write function definition for SUCCESS() in C++ to read the content of a text file STORY.TXT, count the presence of word STORY and display the number of occurrence of this word.

2

Note:

- The word STORY should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example:

If the content of the file STORY.TXT is as follows:

Success shows others that we can do it. It is possible to achieve success with hard work. Lot of money does not mean SUCCESS.

The function SUCCESS() should display the following:

3

- (b) Write a definition for function Economic () in C++ to read each record of a binary file ITEMS.DAT, find and display those items, which costs less than 2500. Assume that the file ITEMS.DAT is created with the help of objects of class ITEMS, which is defined below:

3

```
class ITEMS
{
    int ID; char GIFT[20]; float Cost;
public :
    void Get ()
    {
        cin>>CODE; gets (GIFT); cin>>Cost;
```

```

}

void See ()

{

    cout<<ID<<" :" <<GIFT<<" :" <<Cost<<endl;

}

float GetCost() {return Cost;}.

};


```

- (c) Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with records of 100 members.

1

```

class CLIENTS

{

    int Cno;char Name[20];

public :

    void In(); void Out();

};

void main()

{

    fstream CF;

    CF.open ("CLIENTS.DAT",ios::binary|ios::in);

    CLIENTS C;

    CF.read( (char*) &C, sizeof(C));

    CF.read( (char*) &C, sizeof(C));

    CF.read( (char*) &C, sizeof(C));

    int POS=CF.tellg()/sizeof(C);

```

```

cout<<"PRESENT RECORD:<<POS<<endl;

CF.close () ;

}

```

**Section-B**  
**(Only for Python Candidates)**

1. (a) How is \_init() different from \_del() ? 2

(b) Name the function/method required to 1

- (i) check if a string contains only uppercase letters
- (ii) gives the total length of the list.

(c) Rewrite the following code in python after removing all syntax error(s).

Underline each correction done in the code. 2

```
def Tot(Number) #Method to find Total
```

```
Sum=0
```

```
for C in Range (1, Number+1) :
```

```
Sum+=C
```

```
RETURN Sum
```

```
print Tot[3] #Function Calls
```

```
print Tot[6]
```

(d) Find and write the output of the following python code : 2

```
for Name in ['Jayes', 'Ramya', 'Taruna', 'Suraj']:
```

```
    print Name
```

```
    if Name[0]== 'T':
```

```
        break
```

```
    else :
```

```
    print 'Finished1'
```

```
    print 'Got it1'
```

- (e) Find and write the output of the following python code :

3

```
class Worker :
```

```
    def __init__(self,id,name) : #constructor
```

```
        self.ID=id
```

```
        self.NAME=name
```

```
    def Change(self) :
```

```
        self.ID=self.ID+10
```

```
        self.NAME='Harish'
```

```
    def Display (self,ROW) :
```

```
        print self.ID,self.NAME,ROW
```

```
w=Worker(55,'Fardeen')
```

```
w.Display(1)
```

```
w.Change ()
```

```
w.Display(2)
```

```
print w.ID+len(w.NAME)
```

- (f) What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable NUMBER.

2

```
STRING="CBSEONLINE"
```

```
NUMBER=random.randint(0,3)
```

```
N=9
```

```
while STRING[N] != 'L' :
```

```

print STRING[N]+STRING[NUMBER] + '#',
NUMBER=NUMBER+1

N=N-1

(i) ES#NE#IO# (ii) LE#NO#ON# (iii) NS#IE#LO#
(iv) EC#NB#IS#

```

2. (a) Illustrate the concept inheritance with the help of a python code. 2  
 (b) What will be the output of the following python code ? Explain the try and except used in the code. 2

U=0

V=6

```

print 'First'

try:
    print 'Second'
    M=V/U
    print 'Third',M
except ZeroDivisionError:
    print V*3
    print 'Fourth'

except:
    print V*4
    print 'Fifth'

```

- (c) Write a class PICTURE in Python with following specifications: 4

Instance Attributes

- Pno # Numeric value

- Category # String value
- Location # Exhibition Location with String value

Methods :

- FixLocation() # A method to assign  
# Exhibition Location as per Category  
# as shown in the following table

| Category | Location   |
|----------|------------|
| Classic  | Amina      |
| Modern   | Jim Plaq   |
| Antique  | Ustad Khan |

- Enter() # A function to allow user to enter values  
# Pno, Category and call FixLocation() method
- SeeAll() # A function to display all the data members

(d) What is operator overloading with methods ? Illustrate with the help of an example using a python code.

2

(e) Write a method in python to display the elements of list thrice if it is a number and display the element terminated with '#' if it is not a number.

2

For example, if the content of list is as follows :

ThisList=['41', 'DROND', 'GIRIRAJ', '13', 'ZARA']

The output should be

414141

DROND#

GIRIRAJ#

131313

ZARA#

3. (a) What will be the status of the following list after fourth pass of bubble sort and fourth pass of selection sort used for arranging the following elements in descending order ? 3  
 $14, 10, -12, 9, 15, 35$
- (b) Write a method in python to search for a value in a given list (assuming that the elements in list are in ascending order) with the help of Binary Search method. The method should return -1 if the value not present else it should return position of the value present in the list. 2
- (c) Write PUSH (Books) and POP (Books) methods in python to add Books and remove Books considering them to act as Push and Pop operations of Stack. 4
- (d) Write a method in python to find and display the prime numbers between 2 to N. Pass N as argument to the method. 3
- (e) Evaluate the following postfix notation of expression. Show status of stack after every operation. 2  
 $84, 62, -, 14, 3, ", +$
4. (a) Differentiate between the following : 1
- (i)  $f = \text{open} ('diary. txt', 'r')$   
(ii)  $f = \text{open} ('diary. txt', 'w')$
- (b) Write a method in python to read the content from a text file diary.txt line by line and display the same on screen. 2
- (c) Consider the following definition of class Member, write a method in python to write the content in a pickled file member.dat. 3
- ```
class Member:

    def __init__(self, Mno, N):
        self.Memno=Mno
```

```

self.Name=N

def Show(self):
    Display(self.Memno, "#", self.Name)

```

**Section-C**  
**(For all Candidates)**

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key.

2

<b>Id</b>	<b>Product</b>	<b>Qty</b>	<b>Price</b>	<b>Transaction Date</b>
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

- (b) Consider the following DEPT and WORKER tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii) :

6

Table: DEPT

DCODE	DEPARTMENT	CITY
D01	MEDIA	DELHI
D02	MARKETING	DELHI
D03	INFRASTRUCTURE	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table: WORKER

WNO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	DO1
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	DOS
1007	Ani1 Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	DO1
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	DOS

**Note: DOJ refers to date of joining and DOB refers to date of Birth of workers.**

- (i) To display Wno, Name, Gender from the table WORKER in descending order of Wno.
- (ii) To display the Name of all the FEMALE workers from the table WORKER.
- (iii) To display the Wno and Name of those workers from the table WORKER who are born between '1987-01-01' and '1991-12-01'.
- (iv) To count and display MALE workers who have joined after '1986-01-01' .
- (v) 

```
SELECT COUNT(*) , DCODE FROM WORKER
GROUP BY DCODE HAVING COUNT(*) >1;
```
- (vi) 

```
SELECT DISTINCT DEPARTMENT FROM DEPT;
```
- (vii) 

```
SELECT NAME, DEPARTMENT, CITY FRQM WORKER W,DEPT
D WHERE W. DCODE=D.DCODE AND WNO<100 "3 ;
```
- (viii) 

```
SELECT MAX(DOJ) , MIN(DOB) FROM WORKER;
```

6. (a) Verify the following using Boolean Laws. 2

$$x + y' = x \cdot y + x \cdot y' + x' \cdot y'$$

- (b) Draw the Logic Circuit for the following Boolean Expression : 2

$$(U + V') \cdot W' + Z$$

- (c) Derive a Canonical SOP expression for a Boolean function F, represented by the following truth table : 1

A	B	C	F(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

- (d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(X, Y, Z, W) = \sum(0, 1, 6, 8, 9, 10, 11, 12, 15)$$

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks. 1

- (b) What is a spam mail ? 1

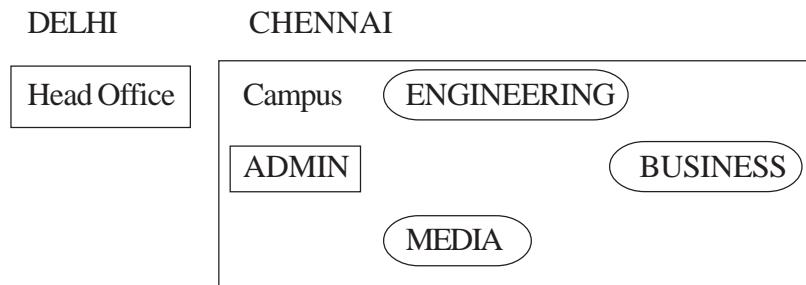
- (c) Differentiate between ftp and http. 1

- (d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication?

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber 1

- (e) What is Worm? How is it removed? 1
- (f) Out of the following, which all comes under cyber crime?
- Stealing away a brand new computer from a showroom.
  - Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.
  - Secretly copying files from server of a call center and selling it to the other organization.
  - Viewing sites on a internet browser.
- (g) Perfect Edu Services Ltd. is an educational organization. It is planning to setup its India campus at Chennai with its head office at Delhi. The Chennai campus has 4 main buildings - ADMIN, ENGINEERING, BUSINESS and MEDIA.

You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various buildings :

ADMIN to ENGINEERING	55m
ADMIN to BUSINESS	90m
ADMIN to MEDIA	50m
ENGINEERING to BUSINESS	55m
ENGINEERING to MEDIA	50m
BUSINESS to MEDIA	45m
DELHI Head Office to CHENNAI Campus	2175 km

Number of Computers installed at various buildings are as follows :

ADMIN	110
ENGINEERING	75
BUSINESS	40
MEDIA	12
DELHI Head Office	20

- (i) Suggest the most appropriate location of the server inside the CHENNAI campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer. 1
- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the CHENNAI campus for connecting the computers. 1
- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus ? 1
- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of CHENNAI campus and DELHI Head Office? 1
  - (a) Cable TV
  - (b) Email
  - (c) Video Conferencing
  - (d) Text Chat

### **QUESTION PAPER CODE 91**

#### **SECTION A**

**[Only for candidates, who opted for C++]**

- 1. (a) Find the correct identifiers out of the following, which can be used for naming Variable, Constants or Functions in a C++ program : 2

For, while, INT, New, delete, 1stName, Add+Subtract, name1

- (b) Observe the following program very carefully and write the names of those header files, which are essentially needed to compile and execute the following program successfully : 1

```
typedef char STRING[80];

void main()
{
    STRING Txt [] = "We love Peace";

    int Count=0;

    while (Txt[Count] != '\0')

        if (isalpha(Txt[Count]))

            Txt[Count++]= '@';

        else

            Txt[Count++]= '#';

    puts(Txt);
}
```

- (c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all required header files are already being included in the program.

```
#Define float MaxSpeed=60.5;

void main()

{
    int MySpeed

    char Alert='N' ;
```

```

    cin>>MySpeed;

    if MySpeed>MaxSpeed

        Alert=' Y' ;

        cout<<Alert<<endl;

    }

```

- (d) Write the output of the following C++ program code: 2

Note : Assume all required header files are already being included in the program.

```

void Location(int &X,int Y=4)

{

    Y+=2;

    X+=Y;

}

void main ()

{

    int PX=10,PY=2;

    Location (PY) ;

    cout<<PX<<" "<<PY<<endl ;

    Location(PX,PY);

    cout<<PX<<" "<<PY<<endl ;

}

```

- (e) Write the output of the following C++ program code: 3

Note: Assume all required header files are already being included in the program.

```

class Eval

{
    char Level;
    int Point;

public:
    Eval() {Level='E'; Point=0; }

    void Sink(int L)
    {
        Level-=L;
    }

    void Float(int L)
    {
        Level+=L;
        Point++;
    }

    void Show()
    {
        cout<<Level<<"#"<<Point<<endl;
    }
}

void main ()
{
    Eval E;
    E.Sink(3);
}

```

```

E.Show () ;

E.Float(7) ;

E.Show () ;

E.Sink(2) ;

E.Show () ;

}

```

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable VAL.

2

Note:

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n-1.

```

void main ()

{
    randomize();

    int VAL;

    VAL=random(3) +2;

    char GUESS [ ]="ABCDEFGHIJK";

    for (int I=1;I<=VAL; I++)

    {
        for(int J=VAL; J<=7;J++)

            cout<<GUESS [J] ;

        cout<<endl;
    }
}

```

(i)	(ii)	(iii)	(iv)
BCDEFGH	CDEFGH	EFGH	FGHI
BCDEFGH	CDEFGH	EFGH	FGHI
		EFGH	FGHI
		EFGH	FGHI

2. (a) What is a copy constructor ? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.

2

- (b) Observe the following C++ code and answer the questions (i) and (ii) :

```
class Passenger
{
    long PNR;
    char Name [201];

public:
    Passenger () //Function 1
    { cout<<"Ready<<endl; }

    void Book(long P,char N[])
        //Function 2
    { PNR = P; strcpy (Name, N); }

    void Print () //Function 3
    { cout<<PNR << Name <<endl; }

    ~Passenger () //Function 4
    { cout<<"Booking cancelled! "<<endl; }

};
```

- (i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2  
and Function 3 respectively in the following code : 1

```
void main()  
{  
    Passenger P;  
    _____ //Line 1  
    _____ //Line 2  
} //Ends here
```

- (ii) Which function will be executed at } //Ends here ? What is this function referred as ? 1

- (c) Write the definition of a class Photo ill C++ with following description: 4

Private Members

- Pno //Data member for Picture Number (an integer)
- Category//Data member for Picture Category (a string)
- Location//Data member for Exhibition Location (a string)
- FixLocation //A member function to assign  
 //Exhibition Location as per category  
 //as shown in the following table

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

Public Members

- Enter() //A function to allow user to enter values

//Pno, category and call FixLocation() function

- SeeAll() //A function to display all the data members

(d) Answer the questions (i) to (iv) based on the following:

4

```
class Interior
```

```
{
```

```
    int OrderId;
```

```
    char Address[20];
```

```
protected:
```

```
    float Advance;
```

```
public:
```

```
    Interior();
```

```
    void Book(); void View();
```

```
} ;
```

```
class Painting:public Interior
```

```
{
```

```
    int WallArea,ColorCode;
```

```
protected:
```

```
    char Type;
```

```
public:
```

```
    Painting();
```

```
    void PBook();
```

```
    void PView();
```

```
} ;
```

```
class Billing : public Painting
```

```

{
    float Charges;

    void Calculate();

public:
    Billing();
    void Bill();
    void BillPrint();
}
;
```

- (i) Which type of Inheritance out of the following is illustrated in the above example?
- Single Level Inheritance
  - Multi Level Inheritance
  - Multiple Inheritance
- (ii) Write the names of all the data members, which are directly accessible from the member functions of class Painting.
- (iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.
- (iv) What will be the order of execution of the constructors, when an object of class Billing is declared ?

3. (a) Write the definition of a function Change (int P[], int N) in C++, which should change all the multiples of 10 in the array to 10 and rest of the elements as 1.

For example, if an array of 10 integers is as follows:

2

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
100	43	20	56	32	91	80	40	45	21

After executing the function, the array content should be changed as follows:

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
10	1	10	1	1	1	10	10	1	1

- (b) A two dimensional array ARR[50][20] is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[30][10], if the element ARR[10][5] is stored at the memory location 15000.

3

- (c) Write the definition of a member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program :

4

```

struct BOOKS

{
    char ISBN[20], TITLE[80];

    BOOKS *Link;
} ;

class STACK

{
    BOOKS *Top;

public:
    STACK() {Top=NULL; }

    void PUSH();
    void POP();
    ~STACK();
}

```

- (d) Write a function REVROW(int P[ ][5],int N,int M) in C++ to display the content of a two dimensional array, with each row content in reverse order.

3

For example, if the content of array is as follows :

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as

51    45    56    12    15

63    87    92    91    13

81    46    61    23    81

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion :

2

U \* V + R / (S - T)

4. (a) Write function definition for TOWER() in C++ to read the content of a text file WRITEUP.TXT, count the presence of word TOWER and display the number of occurrences of this word.

2

Note:

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example:

If the content of the file WRITEUP.TXT is as follows :

Tower of hanoi is an interesting problem. Mobile phone tower is away from here. Views from EIFFEL TOWER are amazing.

The function TOWER() should display the following:

3

- (b) Write a definition for function COSTLY() in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below:

3

```
class GIFTS
{
    int CODE; char ITEM[20]; float PRICE;

public:
    void Procure ()
    {
        cin>>CODE; gets (ITEM); cin>>PRICE;
    }

    void View()
    {
        cout<<CODE<<" : "<<ITEM<<" : "<<PRICE<<endl;
    }

    float GetPrice() {return PRICE; }.

} ;
```

- (c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members:

1

```
class MEMBER
{
    int Mno; char Name[20];

public:
    void In(); void Cut();
```

```

} ;

void main()
{
fstream MF;

MF.open ( "MEMBER. DAT", ios:: binary|ios::in);

MEMBER M;

MF.read( (char*)&M, sizeof(M) );

MF.read( (char*)&M, sizeof(M) );

MF.read( (char*)&M, sizeof(M) );

int POSITION= MF.tellg()/sizeof(M);

cout<<"PRESENT RECORD: "<<POSITION<<endl;

MF.close();

}

```

## **SECTION B**

### **[Only for candidates, who opted for Python]**

- |     |   |   |
|-----|---|---|
| 1.  | (a) How is <u>__init__()</u> different from <u>__del__()</u> ?  | 2 |
|     | (b) Name the function/method required to  | 1 |
|     | (i) check if a string contains only alphabets   |   |
|     | (ii) give the total length of the list  |   |
| (c) | Rewrite the following code in python after removing all syntax error(s).<br>Underline each correction done in the code. | 2 |

def Sum(Count) #Method to · find sum

S=0

```

for I in Range (1,Count+1) :

    S+=I

    RETURN S

print Sum[2]      #Function Call

print Sum[5]

```

- (d) Find and write the output of the following python code: 2

```

for Name in [ 'John' , 'Garima','Seema','Karan' ]:

    print Name

    if Name[0]='S':

        break

else:

    print 'Completed!'

print 'Welldone!'

```

- (e) Find and write the output of the following python code: 3

```

class Emp:

    def __init__(self,code,nm): #constructor

        self.Code=code

        self.Name=nm

    def Manip(self) :

        self.Code=self.Code+10

        self.Name='Karan'

    def Show (self,line) :

        print self.Code,self.Name,line

```

```
s=Emp (25, 'Mamta')

s.Show(1)

s.Manip()

s.Show(2)

print s.Code+1en(s.Name)
```

- (f) What are the possible outcome(s) executed from the following code?  
Also specify the maximum and minimum values that can be assigned to variable COUNT.

2

```
TEXT="CBSEONLINE"

COUNT=random.randint(0,3)

C=9

while TEXT[C] != 'L' :

    print TEXT[C]+TEXT[COUNT]+'*',

    COUNT=COUNT+1

    C=C-1
```

(i) EC\*NB\*IS\*    (ii) NS\*IE\*LO\*    (iii) ES\*NE\*IO\*    (iv) LE\*NO\*ON\*

2. (a) Illustrate the concept inheritance with the help of a python code.

2

- (b) What will be the output of the following python code ? Explain the try and except used in the code.

2

```
A=0

B=6

print 'One'

try:
```

```

print 'Two'

X=B/A

Print 'Three'

except ZeroDivisionError:

    print B*2

    print 'Four'

except:

    print B*3

    print 'Five'

```

- (c) Write a class PHOTO in Python with following specifications:

4

Instance Attributes

- Pno # Numeric value
- Category # String Value
- Exhibit # Exhibition Gallery with String value

Methods:

- FixExhibit() #A method to assign  
#Exhibition Gallery as per Category  
#as shown in the following table

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

- Register() #A function to allow user to enter values  
#Pno, Category and call FixExhibit() method
- ViewAll() #A function to display all the data members

(d) What is operator overloading with methods? Illustrate with the help of an example using a python code. 2

(e) Write a method in python to display the elements of list twice, if it is a number and display the element terminated with '\*' if it is not a number. 2

For example, if the content of list is as follows :

```
MyList=[ 'RAMAN' , '21' , 'YOGRAJ' , '3' , 'TARA' ]
```

The output should be

RAMAN \*

2121

YOGRAJ\*

33

TARA\*

3. (a) What will be the status of the following list after fourth pass of bubble sort and fourth pass of selection sort used for arranging the following elements in descending order? 3

34, -6, 12, -3, 45, 25

(b) Write a method in python to search for a value in a given list (assuming that the elements in list are in ascending order) with the help of Binary Search method. The method should return -1, if the value not present else it should return position of the value present in the list. 2

(c) Write PUSH(Names) and POP(Names) methods in python to add Names and Remove names considering them to act as Push and Pop operations of Stack. 4

(d) Write a method in python to find and display the composite numbers between 2 to N. Pass N as argument to the method. 3

(e) Evaluate the following postfix notation of expression. Show status of stack after every operation. 2

34, 23, +, 4, 5, \*, -

4. (a) Differentiate between the following : 1

(i) `f = open ('diary.txt', 'a')`

(ii) `f = open ('diary.txt', 'w')`

(b) Write a method in python to read the content from a text file story.txt line by line and display the same on screen. 2

(c) Consider the following definition of class Student. Write a method in python to write the content in a pickled file student.dat. 3

`class Student:`

`def __init__(self,A,N) :`

`self.Admno=A`

`self.Name=N`

`def Show (self) :`

`print (self.Admno, "#", self . Name)`

## SECTION C

### [For all candidates]

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key: 2

Code	Item	Qty	Price	Transaction Date
1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

- (b) Consider the following DEPT and EMPLOYEE tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii).

6

Table : DEPT

DCODE	DEPARTMENT	LOCATION
D01	INFRASTRUCTURE	DELHI
D02	MARKETING	DELHI
D03	MEDIA	MUMBAI
DOS	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table : EMPLOYEE

ENO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	D01
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	D05
1007	Anil Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	D01
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	DOS

Note: DOJ refers to date of joining and DOB refers to date of Birth of employees.

- (i) To display Eno, Name, Gender from the table EMPLOYEE in ascending order of Eno.
- (ii) To display the Name of all the MALE employees from the table EMPLOYEE.

- (iii) To display the Eno and Name of those employees from the table EMPLOYEE who are born between '1987-01-01' and '1991-12-01'.
- (iv) To count and display FEMALE employees who have joined after '1986-01-01'.
- (v) 

```
SELECT COUNT (*), DCODE FROM EMPLOYEE
GROUP BY DCODE HAVING COUNT(*) > 1;
```
- (vi) 

```
SELECT DISTINCT DEPARTMENT FROM DEPT;
```
- (vii) 

```
SELECT NAME, DEPARTMENT FROM EMPLOYEE E, DEPT D
WHERE E.DCODE=D.DCODE AND ENO < 1003;
```
- (viii) 

```
SELECT MAX (DOJ), MIN (DOB) FROM EMPLOYEE;
```

6. (a) Verify the following using Boolean Laws :

2

$$U' + V = U'V' + U' \cdot V + U \cdot V$$

(b) Draw the Logic Circuit for the following Boolean Expression :

2

$$(X' + Y) \cdot Z + W'$$

(c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table :

1

p	Q	R	F(P,Q,R)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

- (d) Reduce the following Boolean Expression to its simplest form using K-Map:

3

$$F(X, Y, Z, W) = \Sigma(0, 1, 4, 5, 6, 7, 8, 9, 11, 15)$$

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

1

- (b) What kind of data gets stored in cookies and how is it useful?

1

- (c) Differentiate between packet switching over message switching?

1

- (d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication?

1

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber

- (e) What is Trojan Horse?

1

- (f) Out of the following, which all comes under cyber crime?

1

(i) Stealing away a brand new hard disk from a showroom.

(ii) Getting in someone's social networking account without his consent and posting on his behalf.

(iii) Secretly copying data from server of an organization and selling it to the other organization.

(iv) Looking at online activities of a friends blog.

- (g) Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and ARTS. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.

DELHI

HYDERABAD

Head Office

Campus

SCIENCE

ADMIN

BUSINESS

ARTS

Shortest distances between various buildings :

ADMIN to SCIENCE	65m
ADMIN to BUSINESS	100m
ADMIN to ARTS	60m
SCIENCE to BUSINESS	75m
SCIENCE to ARTS	60m
BUSINESS to ARTS	50m
DELHI Head Office to HYDERABAD Campus	1600Km

Number of computers installed at various buildings are as follows:

ADMIN	100
SCIENCE	85
BUSINESS	40
ARTS	12
DELHI Head Office	20

- (i) Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum number of computers. Justify your answer. 1
- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the HYDERABAD campus for connecting the computers. 1
- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus? 1
- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of

HYDERABAD campus and DELHI Head Office?

1

- (i) E-mail
- (ii) Text Chat
- (iii) Video Conferencing
- (iv) Cable TV

## **Marking Scheme — Computer Science**

### ***General Instructions :***

- The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions/Answers conveying similar meaning.
- All programming questions have to be answered with respect to C++ Language for Section A and Python for Section B (All presently supported versions of compilers/interpreters should be considered).
- In C++/Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names) unless explicitly specified in question.
- In SQL related questions:
  - Both ways of text/character entries should be acceptable. For example: "AMAR" and 'amar' both are acceptable.
  - All date entries should be acceptable for example: 'YYVY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', UDD/MM/YY", 'DD/MMIYY', 'MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
  - Semicolon should be ignored for terminating the SQL statements.
  - Ignore case sensitivity for commands.
  - Ignore headers in output questions.

**QUESTION PAPER CODE 91/1**

### **EXPECTED ANSWERS**

#### **Section-A**

**(Only for C++ Candidates)**

1. (a) Find the correct identifiers out of the following, which can be used for naming variable, constants or functions in a C++ program:

2

While, for, Float, new, 2ndName, A%B, Amount2, \_Counter

Ans While, Float, Amount2, \_Counter

(*½ Mark for each correct identifier*)

*Note:*

- *Deduct ½ Mark for writing additional incorrect identifier(s)*
- *No marks to be awarded if all the identifiers are mentioned*

(b) Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully:

1

```
typedef char TEXT [80];

void main ()
{
    TEXT Str[] = "Peace is supreme";

    int Index=0;

    while (Str[Index] != '\0')

        if (isupper(Str[Index]))
            Str[Index++]='#';

        else
            Str[Index++]='*';

    puts (Str);
}
```

Ans ctype, stdio

(*½ Mark for each correct header file*)

*Note:*

*Ignore any additional header file(s)*

- (c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined.

2

Note: Assume all required header files are "already being included in the program.

```
#Define float Max=70.0;
```

```
Void main()
```

```
{
```

```
    int Speed
```

```
    char Stop='N' ;
```

```
    cin>>Speed;
```

```
    if Speed>Max
```

```
        Stop='Y' ;
```

```
        cout<<Stop<<end;
```

```
}
```

```
Ans #define Max 70.0      //Error 1,2,3
```

```
void main ()           //Error 4
```

```
{
```

```
    int Speed ;          //Error 5
```

```
    char Stop=' N' ;
```

```
    cin>>Speed;
```

```
    if (Speed>Max)      //Error 6
```

```
        Stop=' Y' ;
```

```
        cout<<Stop<<endl;   //Error 7
```

```
}
```

*(1/2 Mark for each correction upto a maximum of 4 corrections)*

**OR**

*(1 Mark for only identifying any 4 errors, without suggesting corrections)*

- (d) Write the output of the following C++ program code:

2

Note : Assume all required header files are already being included in the program.

```
void Position(int &C1, int C2=3)

{
    C1+=2;

    C2+=Y;

}

void main()

{
    int P1=20, P2=4;

    Position(P1);

    cout<<P1<<" , "<<P2<<endl;

    Position(P2,P1);

    cout<<P1<<" , "<<P2<<endl;

}
```

Ans 22, 4

22, 6

*(1/2 Mark for each correct value of output)*

*Note:*

- *Deduct V2 Mark for not considering any or all end/(s) at proper place(s)*
- *Deduct l'2 Mark for not considering any or all ',' at proper place(s)*

*OR*

*(Full 2 marks to be awarded for mentioning Syntax Error OR undeclared variable Y)*

- (e) Write the output of the following C++ program code: 3

Note: Assume all required header files are already being included in the program.

```
class Calc

{
    char Grade;
    int Bonus;

public:
    Calc() {Grade='E';Bonus=0;}
    void Down(int G)
    {
        Grade-=G;
    }
    Void Up (int G)
    {
        Grade+=G;
        Bonus++;
    }
}
```

```

    }

void Show()

{
    cout<<Grade<<"#"<<Bonus<<endl;

}

};

void main()

{
    Calc c;

    C.Down(2);

    C. Show();

    C.Up(7);

    C.Show();

    C.Down(2);

    C. Show();
}

```

Ans C#0

J#1

H#1

*(1 Mark for each correct line of output)*

*Note:*

- *Deduct 1/2 Mark for not considering any or all end/(s) at proper place(s)*
- *Deduct 1/2 Mark for not writing any or all # symbol(s)*

*OR*

**(Full 3 marks to be awarded if undeclared object C OR ERROR is identified)**

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable NVM.

2

Note:

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n - 1.

```
void main()

{
    randomize();

    int NOM;

    NOM=random(3)+2;

    char TEXT[ ]="ABCDEFGHIJK";

    for (int I=1;I<=NOM; I++)

    {
        for(int J=NUM; J<=7iJ++)
            cout<<TEXT[J];

        cout<<endl;
    }
}
```

(i) FGHI      (ii) BCDEFGH    (iii) EFGH      (iv) CDEFGH

FGHI	BCDEFGH	EFGH	CDEFGH
FGHI		EFGH	
FGHI		EFGH	

Ans (iii) and (iv)	Minimum value of NUM = 2
	Maximum value of NUM = 4

(*1/2 Mark for writing option (iii) )*

(*1/2 Mark for writing option (iv) )*

**Note: Deduct V2 mark for writing each additional option along with both correct options**

(*1/2 Mark for writing correct Minimum value of NUM)*

(*1/2 Mark for writing correct Maximum value of NUM)*

2. (a) What is a copy constructor? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.

2

Ans A copy constructor is an overloaded constructor in which an object of the same class is passed as reference parameter.

```

class Point

{
    int x;

public:
    Point () {x=0; }

    Point (Point &p) // Copy constructor
    {x = p.x; }

    :

}

void main ()
{
    Point p1;

```

```

Point p2(p1); //Copy constructor is called here

//OR

Point p3=p1; //Copy constructor is called here

}

```

**(1½ Mark to be awarded if the copy constructor is explained with an appropriate example)**

**OR**

**(1 Mark for correct explanation of copy constructor only without an example)**

**(½ Mark for correct declaration of an object)**

- (b) Observe the following C++ code and answer the questions (i) and (ii) :

2

```

class Traveller

{

    long PNR;

    char TName[20];

public :

    Traveller()                                //Function 1

    {cout<<"Ready"<<endl; }

    void Book(long P,char N[])                  //Function 2

    {PNR = P, strcpy(TName, N);}

    void Print()                               //Function 3

    {cout<<PNR << TName <<endl; }

    ~Traveller()                                //Function 4

    cout<<"Booking cancelled"<<endl;

```

};

- (i) Fill in the blank: statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code:

1

```
void main()
{
    Traveller T;
    _____ //Line 1
    _____ //Line 2
} //Stops here
```

Ans T.Book(1234567, "Ravi"); //Line 1

T.Print(); //Line 2

(*1/2 Mark for writing each correct Function*)

- (ii) Which function will be executed at l//Stops here? What is this function referred as?

1

Ans Function 4

OR

`~Traveller()`

**It is a Destructor function.**

(*1/2 Mark for writing Function 4 or - Traveller()*)

(*1/2 Mark for referring Destructor*)

- (c) Write the definition of a class PIC in C++ with following description:

4

Private Members

- Pno //Data member for Picture Number (an integer)
- Category//Data member for Picture Category (a string)

- Location //Data member for Exhibition Location (a string)
- FixLocation //A member function to assign
  - //Exhibition Location as per category
  - //as shown in the following table

Category	Location
Classic	Amina
Modern	Jim Plaq
Antique	Ustad Khan

#### Public Members

- Enter() //A function to allow user to enter values
  - //Pno, category and call FixLocation() function
- SeeAll() //A function to display all the data members

Ans class PIC

```
{
    int Pno;
    char Category[20];
    char Location[20];
    void FixLocation();

public:
    void Enter();
    void SeeAll();
} ;
void PIC::FixLocation()
{
```

```

    if (strcmpi (Category, "Classic") ==0)
        strcpy(Location, "Amina") ;
    else if(strcmpi(Category, "Mbdern") ==0)
        strcpy(Location, "Jim Plaq") ;
    else if strcmpi (Category, "Antique") ==0)
        strcpy(Location, "Ustad Khan") ;
}

void PIC::Enter()
{
    cin>>Pno;gets(Category) ;
    FixLocation() ;
}

void PIC:: SeeAll()
{
    cout<<Pno<<Category<<Location<<endl;
}

```

*(1/2 Mark for correct syntax for class header)*

*(1/2 Mark for correct declaration of data members)*

*(1 Mark for correct definition of FixLocation())*

*(1 Mark for correct definition of Enter() with proper invocation of FixLocation() function)*

*(1 Mark for correct definition of SeeAll())*

**NOTE:**

- *Deduct 1/2 Mark if FixLocation() is not invoked properly inside Enter() function*

- *No marks to be deducted for defining Member Functions inside the class*
- *strcmp()/strcmpl() acceptable*

(d) Answer the questions (i) to (iv) based on the following:

4

```

class Exterior

{
    int OrderId;
    char Address[20];

protected:
    float Advance;

public:
    Exterior();
    void Book(); void View();
};

class Paint:public Exterior

{
    int WallArea,ColorCode;

protected:
    char Type;

public:
    Paint();
    void PBook();
    void PView();
};

```

```

class Bill : public Paint

{
    float Charges;

    void Calculate();

public :

    Bill ();
    void Billing ();
    void Print ();

};

```

- (i) Which type of Inheritance out of the following is illustrated in the above example?
- Single Level Inheritance
  - Multi Level Inheritance
  - Multiple Inheritance

Ans **Multi Level Inheritance**

*(1 Mark for mentioning correct option)*

- (ii) Write the names of all the data members, which are directly accessible from the member functions of class Paint.

Ans **WallArea, ColorCode, Type, Advance**

*(1 Mark for correct answer)*

**Note: No marks to be awarded for any partial/additional answer(s)**

- (iii) Write the names of all the member functions, which are directly accessible from an object of class Bill.

Ans **Billing(), Print(), PBook(), PView(), Book(), View()**

*(1 Mark for correct answer)*

**Note:**

- *No marks to be awarded for any partial/additional answer(s)*
  - *Constructors can be ignored*
- (iv) What will be the order of execution of the constructors, when an object of class Bill is declared ?

Ans **Exterior(), Paint(), Bill()**

**(1 Mark for correct answer)**

**Note: No marks to be awarded for any other order**

3. (a) Write the definition of a function Alter(int A[], int N) in C++, which should change all the multiples of 5 in the array to 5 and rest of the elements as 0.
- For example, if an array of 10 integers is as follows:

2

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
55	43	20	16	39	90	83	40	48	25

After executing the function, the array content should be changed as follows:

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
5	0	5	0	0	5	0	5	0	5

Ans void Alter (int A[ ] lint N)

```
{  
    for (int i=0;i<N;i++)  
        if (A[i] %5==0)  
            A[i]=5;  
        else  
            A[i]=0;  
}
```

**OR**

**Any other correct equivalent function definition**

*(1/2 Mark for correct loop)*

*(1/2 Mark for correct checking of divisibility of array elements by 5)*

*(1/2 Mark for correct use of else OR correct checking of non divisibility of array elements by 5 )*

*(1/2 Mark for correct assignment of 5 and 0 for multiples and non multiples of 5 respectively)*

- (b) A two dimensional array P[20] [50] is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element P[10] [30], if the element P[5] [5] is stored at the memory location 15000.

3

Ans Loc (P [I] [J]) along the row

$$= \text{BaseAddress} + W [ (I - LBR) * C + (J - LBC) ]$$

(where C is the number of columns, LBR=LBC=0)

$$\text{LOC } (P [5] [5])$$

$$= \text{BaseAddress} + W * [I * C + J]$$

$$15000 = \text{BaseAddress} + 4 * [5 * 50 + 5]$$

$$= \text{BaseAddress} + 4 * [250 + 5]$$

$$= \text{BaseAddress} + 4 * 255$$

$$= \text{BaseAddress} + 1020$$

$$\text{BaseAddress} = 15000 - 1020 = 13980$$

$$\text{LOC } (P [10] [30]) = 13980 + 4 * [10 * 50 + 30]$$

$$= 13980 + 4 * 530$$

$$= 13980 + 2120$$

$$= 16100$$

OR

$$\begin{aligned}\text{LOC } (\text{P} [ 10 ] [ 30 ] ) \\ &= \text{Loc}(\text{P}[5] [ 5 ]) + \text{W}[(\text{I}-\text{LBR}) * \text{C} + (\text{J}-\text{LBC})] \\ &= 15000 + 4[(10-5) * 50 + (30-5)] \\ &= 15000 + 4[5 * 50 + 25] \\ &= 15000 + 4 * 275 \\ &= 15000 + 1100 \\ &= 16100\end{aligned}$$

OR

(Where C is the number of columns and LBR=LBC=1)

$\text{LOC } (\text{P} [ 5 ] [ 5 ] )$

$$\begin{aligned}15000 &= \text{BaseAddress} + \text{W}[(\text{I}-1) * \text{C} + (\text{J}-1)] \\ &= \text{BaseAddress} + 4[4 * 50 + 4] \\ &= \text{BaseAddress} + 4[200 + 4] \\ &= \text{BaseAddress} + 4 * 204 \\ &= \text{BaseAddress} + 816\end{aligned}$$

$$\text{BaseAddress} = 15000 - 816 = 14184$$

$\text{LOC } (\text{P} [ 10 ] [ 30 ] )$

$$\begin{aligned}&= 14184 + 4[(10-1) * 50 + (30-1)] \\ &= 14184 + 4[9 * 50 + 29] \\ &= 14184 + 4[450 + 29] \\ &= 14184 + 4 * 479 \\ &= 14184 + 1916 \\ &= 16100\end{aligned}$$

*(1 Mark for writing correct formula (for row major) OR  
substituting formula with correct values)*

*( 1 Mark for at least one step of intermediate calculation)*

*( 1 Mark for final correct address)*

- (c) Write the definition of a member function Pop( ) in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already included in the program.

4

```
struct TEXTBOOKS
{
    char ISBN[20]; char TITLE[80];
    TEXTBOOKS *Link;
};

class STACK
{
    TEXTBOOKS *Top;
public:
    STACK() {Top=NULL; }

    void Push();
    void pope();
    ~STACK();
};
```

Ans void STACK::POP ()

```
{  
if (Top!=NULL)
```

```

{
    TEXTBOOKS *Temp;

    Temp=Top;

    cout<<Top->ISBN<<Top->TITLE<<"deleted"<<endl;

    Top=Top->Link;

    delete Temp;

}

else

cout<<"Stack Empty"<<endl;

}

```

**OR**

**Any other correct equivalent function definition**

**(1 Mark for checking Empty/Non-empty STACK)**

**( 1 Mark for assigning Top to Temp)**

**(1 Mark for linking the Top to next node)**

**(1 Mark for deleting Temp node)**

- (d) Write a function REVCOL (int P[] [5], int N, int M) in C++ to display the content of a two dimensional array, with each column content in reverse order.

3

Note: Array may contain any number of rows.

For example, if the content of array is as follows:

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as :

```
11   23   61   46   81  
13   91   92   87   63  
15   12   56   45   51
```

Ans void REVCOL(int P[] [5], int N, int M)

```
{  
    for(int I=N-1; I>=0; I--)  
    {  
        for(int J=0; J<M; J++)  
            cout<<P[1] [J];  
        cout<<endl;  
    }  
}
```

OR

```
void REVCOL(int P[] [5], int N, int M)  
{  
    for(int I=0; I<N/2; I++)  
    {  
        for(int J=0; J<M; J++)  
        {  
            int T = P[1] [J];  
            P[1] [J] = P[N-1-I] [J];  
            P[N-1-I] [J] = T;  
        }  
    }
```

```

}

for (I=0; I<N; I++)
{
    for (int J=0; J<M; J++)
        cout<<P[1][J];
    cout<<endl;
}

```

*(1 Mark for correct nesting of loop(s))*

*(1½ Mark for correct logic for reversing the content of each column)*

*(½ Mark for correctly displaying the content)*

**Note:**

- ***N and M can be written interchangeably for number of rows and columns***

- (e) Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.

2

X / Y + U\* (V-W)

$$\text{Ans } X / Y + U^* (V-W) = ((X / Y) + (U^* (V-W)))$$

<b>Element</b>	<b>Stack</b>	<b>Postfix</b>
(		
(		
X		X
/	/	X
Y	/	XY

)		XY/
+	+	XY/
(	+	XY/
U	+	XY/U
*	+ *	XY/U
(	+ *	XY/U
V	+ *	XY/UV
-	+ * -	XY/UV
W	+ * -	XY/UVW
)	+ *	XY/UVW-
)	+	XY/UVW-*
)		XY/UVW-*+

OR

Element	Stack	Postfix
X		X
/	/	X
Y	/	XY
+	+	XY
U	+	XY/U
*	+*	XY/U
(	+*(	XY/U
V	+*(	XY/UV
-	+*( -	XY/UV

W	$+ * ( -$	XY/UVW-
)	$+ *$	XY/UVW-*
		XY/UVW-*+

**OR**

**Any other method for converting the given Infix expression to its equivalent Postfix expression showing stack contents**

*(1/2 Mark for converting expression up to each operator)*

**OR**

*(1 Mark to be given for writing correct answer without showing the Stack Content on each step)*

4. (a) Write function definition for SUCCESS() in C++ to read the content of a text file STORY.TXT, count the presence of word STORY and display the number of occurrence of this word. 2

Note:

- The word STORY should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example:

If the content of the file STORY.TXT is as follows:

Success shows others that we can do it. It is possible to achieve success with hard work. Lot of money does not mean SUCCESS.

The function SUCCESS() should display the following:

3

Ans void SUCCESS ()

{

```

int count=0;

ifstream f ("STORY.TXT") ;

char s[20] ;

while (!f.eof ()) 

{

    f>>s;

    if (strcmpi (s, "STORY")==0)

//OR if(strcmpi(s, "SUCCESS")==0)

        count++;

}

cout<<count;

f.close () ;

}

```

**OR**

**Any other correct function definition**

(*1/2 Mark for opening STORY. TXT correctly*)

(*1/2 Mark for reading each word (using any method) from the file*)

(*1/2 Mark for comparing the word with STORY OR SUCCESS*)

(*1/2 Mark for displaying correct count of STORY OR SUCCESS*)

**NOTE:**

(*1/2 Mark to be deducted if STORY or SUCCESS is compared without ignoring the case*)

- (b) Write a definition for function Economic () in C++ to read each record of a binary file ITEMS.DAT, find and display those items, which costs less than

2500. Assume that the file ITEMS.DAT is created with the help of objects of class ITEMS, which is defined below:

3

```
class ITEMS

{
    int ID; char GIFT[20]; float Cost;

public :
    void Get ()
    {
        cin>>CODE; gets(GIFT); cin>>Cost;
    }

    void See ()
    {
        cout<<ID<<" :" <<GIFT<<" :" <<Cost<<endl;
    }

    float GetCost() {return Cost; }.

};
```

Ans void Economic()

```
{
    ITEMS I;

    ifstream fin ("ITEMS.DAT", ios::binary);

    while (fin.read((char *)&I,sizeof(I)))
    {
        if(I.GetCost()<2500)
            I. See () ;
```

```
    }  
  
    fin. close () ;  
  
}
```

**OR**

**Any other correct equivalent function definition**

*(½ Mark for opening ITEMS.DAT correctly)*

*(1 Mark for reading all records from the file)*

*(1 Mark for checking value of Cost < 2500 )*

*(½ Mark for displaying the desired items)*

- (c) Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with records of 100 members.

1

```
class CLIENTS  
  
{  
  
    int Cno;char Name[20] ;  
  
public :  
  
    void In(); void Out();  
  
};  
  
void main()  
  
{  
  
    fstream CF;  
  
    CF.open ("CLIENTS.DAT",ios::binary|ios::in);  
  
    CLIENTS C;  
  
    CF.read((char*) &C, sizeof(C));  
  
    CF.read((char*) &C, sizeof(C));
```

```

CF.read( (char*) &C, sizeof(C) ) ;

int POS=CF.tellg()/sizeof(C) ;

cout<<"PRESENT RECORD:"<<POS<<endl;

CF.close () ;

}

```

Ans PRESENT RECORD: 3

**(1 Mark for writing PRESENT RECORD: 3)**

**OR**

**(1 Mark for writing only 3)**

**OR**

**(½ Mark for writing only PRESENT RECORD:)**

### **Section-B**

**(Only for Python Candidates)**

1. (a) How is \_\_init\_\_() different from \_\_del\_\_() ?

2

Ans \_\_init\_\_() is the class constructor or initialization method which is automatically invoked when we create a new instance of a class

\_\_del\_\_() is a destructor which is automatically invoked when an object (instance) goes out of scope.

For Example:

```
class Sample:
```

```

def __init__(self) :
    self.data = 79
    print ('Data:', self.data, 'created')

def __del__(self) :
    print('Data: ', self.data, 'deleted')

```

```
s = Sample ()
```

```
del s
```

**(2 Marks for correct differentiation)**

**OR**

**(2 Marks for differentiation through example)**

**OR**

**(1 Mark for each correct definition)**

- (b) Name the function/method required to 1

- (i) check if a string contains only uppercase letters
- (ii) gives the total length of the list.

Ans (i) isupper()

(ii) len()

**(1/2 Mark for each correct function/ method name)**

- (c) Rewrite the following code in python after removing all syntax error(s).

Underline each correction done in the code.

2

```
def Tot(Number) #Method to find Total  
    Sum=0  
    for C in Range (1, Number+1):  
        Sum+=C  
    RETURN Sum  
  
    print Tot[3]      #Function Calls  
  
    print Tot[6]
```

Ans def Tot (Number) \_\_: #Method to find Total #Error 1

Sum=0

```

for C in range (1, Number+1) :           #Error 2

    Sum+=C

return Sum                                #Error 3

print Tot (3) #Function Call          #Error 4

print Tot (6)                                #Error 4

(1/2 Mark for each correction)

```

**OR**

**(1 mark for identifying all the errors, without suggesting corrections)**

- (d) Find and write the output of the following python code :

2

```

for Name in [ 'Jayes' , 'Ramya' , 'Taruna' , 'Suraj' ]:

    print Name

    if Name[0]== 'T':

        break

    else :

        print 'Finished1'

    print 'Got it!'

```

Ans Jayes

Ramya

Taruna

Got it!

*(1/2 Mark for each correct line)*

**Note:**

**Deduct 1/2 Mark for not considering any or all line breaks at proper place(s)**

- (e) Find and write the output of the following python code :

3

```
class Worker :  
  
    def __init__(self,id,name) : #constructor  
        self.ID=id  
        self.NAME=name  
  
    def Change(self):  
        self.ID=self.ID+10  
        self.NAME='Harish'  
  
    def Display (self,ROW) :  
        print self.ID,self.NAME,ROW  
  
w=Worker(55,'Fardeen')  
  
w.Display(1)  
  
w.Change ()  
  
w.Display(2)  
  
print w.ID+len(w.NAME)
```

Ans 55 Fardeen 1

65 Harish 2

71

**(1 Mark for each correct line)**

**Note:**

**Deduct ½ Mark for not considering any or all line break(s) at proper place(s).**

- (f) What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable NUMBER.

2

```

STRING="CBSEONLINE"

NUMBER=random.randint(0,3)

N=9

while STRING[N] != 'L' :

    print STRING[N]+STRING[NUMBER] + '#' ,

    NUMBER=NUMBER+1

    N=N-1

(i) ES#NE#IO# (ii) LE#NO#ON# (iii) NS#IE#LO#
(iv) EC#NB#IS#

```

Ans (i) ES#NE#IO#

(iv) EC#NB#IS#

Minimum value of NUMBER = 0

Maximum value of NUMBER = 3

*(½ Mark for writing option (i))*

*(½ Mark for writing option (iv) )*

**Note:**

- *Deduct ½ mark for writing each additional option along with both correct options*

*(½ Mark for writing correct Minimum value of NUMBER)*

*(½ Mark for writing correct Maximum value of NUMBER)*

2. (a) Illustrate the concept inheritance with the help of a python code.

2

Ans class Base :

```

def __init__(self):
    print "Base Constructor at work ... "

```

```

def show (self) :

    print "Hello Base"

class Der(Base) :

    def __init__ (self):
        print "Derived Constructor at work ... "

    def display (self) :

        print "Hello from Derived"

```

**(1 Mark for base class)**

**(1 Mark for derived class)**

- (b) What will be the output of the following python code ? Explain the try and except used in the code.

2

```

U=0

V=6

print 'First'

try:

    print 'Second'

    M=V/U

    print 'Third',M

except ZeroDivisionError

    print V*3

    print 'Fourth'

except:

    print V*4

    print 'Fifth'

```

Ans First

Second

18

Fourth

**The code written within try triggers the exception written after except  
Zero Division Error: in case there is a division by zero error otherwise  
the default exception is executed**

**OR**

**Any other correct explanation for usage of try and except**

*(1/2 Mark for first two lines of correct output)*

*(1/2 Mark for next two lines of correct output)*

*(1/2 Mark each for correct explanation of try and except)*

- (c) Write a class PICTURE in Python with following specifications:

4

Instance Attributes

- Pno # Numeric value
- Category # String value
- Location # Exhibition Location with String value

Methods :

- FixLocation() # A method to assign
  - # Exhibition Location as per Category
  - # as shown in the following table

Category	Location
Classic	Amina
Modern	Jim Plaq
Antique	Ustad Khan

- Enter() # A function to allow user to enter values  
# Pno, Category and call FixLocation() method
- SeeAll() # A function to display all the data members

Ans class PICTURE:

```
Pno=0

Category=" "

Location=" "

def FixLocation() :

    if self.Category=="Classic":

        self.Location="Amina"

    elif self.Category "Modern":

        self.Location="Jim Plaq"

    elif self.Category=="Antique":

        self.Location="Ustad Khan"

def Enter() :

    self.Pno=int(input("Enter Pno:"))

    self.Category=input("Enter Name:")

    self.FixLocation()

def SeeAll():

    print self.Pno,self.Category,self.Location
```

*(1/2 Mark for correct syntax for class header)*

*(1/2 Mark for correct declaration of instance attributes)*

*(1 Mark for correct definition of FixLocation())*

*(1 Mark for correct definition of Enter() with proper invocation of FixLocation() method)*

*(1 Mark for correct definition of SeeAll())*

**NOTE:**

*Deduct ½ Mark if FixLocation() is not invoked properly inside Enter() method*

- (d) What is operator overloading with methods ? Illustrate with the help of an example using a python code. 2

Ans Operator overloading is an ability to use an operator in more than one form.

Examples:

In the following example operator + is used for finding the sum of

two integers:

```
a = 7  
b = 5  
print (a+b) # gives the output: 12
```

Whereas in the next example, shown below the same + operator is used to add two strings:

```
a = 'Indian'  
b = 'Government'  
print (a+b) #gives the output: Indian Government
```

*(1 Mark for correct definition of Operator overloading)*

*(1 Mark for correct example of Python code to illustrate Operator overloading)*

- (e) Write a method in python to display the elements of list thrice if it is a number and display the element terminated with '#' if it is not a number. 2

For example, if the content of list is as follows :

```
ThisList=['41', 'DROND', 'GIRIRAJ', '13', 'ZARA']
```

The output should be

414141

DROND#

GIRIRAJ#

131313

ZARA#

Ans def fun (L) :

    for I in L:

        if I.isnumeric() :

            print(3\*I) # equivalently: print(I+I+I)

        else:

            print(I+'#')

*(1/2 Mark for correct loop)*

*(1/2 Mark for checking numeric/non numeric)*

*(1/2 Mark for displaying numeric content)*

*(1/2 Mark for displaying numeric content)*

3. (a) What will be the status of the following list after fourth pass of bubble sort and fourth pass of selection sort used for arranging the following elements in descending order ?

3

14, 10, -12, 9, 15, 35

Ans Bubble Sort

14,10,-12,9,15,35      (Original Content)

i. 14,10,9,15,35,-12

ii. 14,10,15,35,9,-12

- iii. 14,15,35,10,9,-12
- iv. 15,35,14,10,9,-12      (Unsorted status  
after 4th pass)

**Selection Sort**

- 14,10,-12,9,15,35      (Original Content)
- i. 35,10,-12,9,15,14
- ii. 35,15,-12,9,10,14
- iii. 35,15,14,9,10,-12
- iv. 35,15,14,10,9,-12

**For Bubble Sort**

(1½ Mark if (iv) pass is correct)

**OR**

(½ Mark for (i) pass)

(½ Mark for (jj) pass)

(½ Mark for (iii) pass)

**For Selection Sort**

(1½ Mark if (iv) pass is correct)

**OR**

(½ Mark for (i) pass)

(½ Mark for (ii) pass)

(½ Mark for (iii) pass)

- (b) Write a method in python to search for a value in a given list (assuming that the elements in list are in ascending order) with the help of Binary Search method. The method should return -1 if the value not present else it should return position of the value present in the list.

```

Ans def bSearch(L, key) :

    low = 0

    high = len(L)-1

    found = False

    while (low <= high) and (not found) :

        mid = (low+high)//2

        if L[mid]== key:

            found = True

        elif L[mid] < key:

            low = mid + 1

        else:

            high = mid - 1

        if found:

            return mid+1 # may even be 'return mid'

        else:

            return -1

```

*(1/2 Mark for correct Initialization of lower and upper bounds)*

*(1/2 Mark for correct loop)*

*(1/2 Mark for reassigning Mid, Low, Up bound)*

*(1/2 Mark for returning correct value)*

- (c) Write PUSH (Books) and POP (Books) methods in python to add Books and remove Books considering them to act as Push and Pop operations of Stack.

4

```

Ans def push (Books) :

```

```

Stack.append (Books)

print 'Element:',Book,'inserted successfully'

def pop() :

    if Stack == [ ]:

        print (' Stack is empty! ')

    else:

        print('Deleted element is', Stack.pop())

```

*(2 Marks for correctly pushing an element into the stack)*

*(1 Mark for checking empty stack in POP())*

*(1 Mark for popping element from stack)*

- (d) Write a method in python to find and display the prime numbers between 2 to N. Pass N as argument to the method.

3

```

Ans def prime_numbers(N) :

    for I in range(2, N+1):

        M = I // 2

        IsPrime=1

        for J in range(2, M+1) :

            if I % J == 0:

                IsPrime=0

                break

        if IsPrime==1:

            print (I)

```

**OR**

**Any other correct equivalent method definition**

**(1 Mark for correct loops)**

**(1 Mark for checking prime numbers between 2 to N)**

**(1 Mark for displaying the numbers)**

- (e) Evaluate the following postfix notation of expression. Show status of stack after every operation.

2

84, 62, -, 14, 3, ", +

Ans	Element	Stack
	84	84
	62	84, 62
	-	22
	14	22, 14
	3	22, 14, 3
	*	22, 42
	+	64

**(1 mark for evaluating till 22)**

**(1/2 mark for evaluating till 22,42)**

**(1/2 mark for evaluating till final 64)**

**Note:**

**Only 1 mark to be awarded for evaluating final answer as 64 without showing stack contents**

4. (a) Differentiate between the following :

1

- (i) f = open ('diary. txt', 'r' )  
(ii) f = open ('diary. txt', 'w' )

Ans (i) diary.txt is opened for reading data

(ii) diary.txt is opened for writing data

*(1 mark for writing correct difference)*

*OR*

*(1/2 Mark for each correct explanation of (i) and (II))*

- (b) Write a method in python to read the content from a text file diary.txt line by line and display the same on screen.

2

Ans def read\_file () :

```
    inFile = open('diary.txt', 'r')  
  
    for line in inFile:  
  
        print line
```

*(1/2 Mark for opening the file)*

*(1 Mark for reading all lines)*

*(1/2 Mark for displaying all lines)*

- (c) Consider the following definition of class Member, write a method in python to write the content in a pickled file member.dat.

3

```
class Member:
```

```
    def __init__(self, Mno, N):  
  
        self.Memno=Mno  
  
        self.Name=N  
  
    def Show(self):  
  
        Display(self.Memno, "#", self.Name)
```

Ans import pickle

```
class Member:
```

```

def __init__(self, Mno, N) :

    self.Memno=Mno

    self.Name=N

def Show (self) :

    Display (self.Memno, "#", self . Name)

def store_data (self) :

    piFile = open ('member. dat', 'wb')

    pickle.dump (self, piFile)

    piFile.close()

```

*(1 Mark for method header)*

*(1 Mark for opening the file member dat in correct mode)*

*(1 Mark each for writing member details into the file)*

### Section-C

**(For all Candidates)**

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key.

2

<b>Id</b>	<b>Product</b>	<b>Qty</b>	<b>Price</b>	<b>Transaction Date</b>
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

Ans Candidate keys : Id, Product

Primary keys : Id

(1 Mark for writing correct Candidate keys)

(1 Mark for writing correct Primary key)

**Note:**

**No marks to be deducted for mentioning Price and/or Transaction Date as additional candidate keys.**

- (b) Consider the following DEPT and WORKER tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii) :

6

Table: DEPT

DCODE	DEPARTMENT	CITY
D01	MEDIA	DELHI
D02	MARKETING	DELHI
D03	INFRASTRUCTURE	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table: WORKER

WNO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	DO1
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	D05
1007	Anil Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	DO1
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	D05

**Note: DOJ refers to date of joining and DOB refers to date of Birth of workers.**

- (i) To display Wno, Name, Gender from the table WORKER in descending order of Wno.

Ans SELECT Wno,Name,GenderFROM Worker  
ORDER BY Wno DESC;

*(½ Mark for SELECT Wno, Name, Gender FROM Worker)*

*(½ Mark for ORDER BY Wno DESC)*

- (ii) To display the Name of all the FEMALE workers from the table WORKER.

Ans SELECT Name FROM Worker  
WHERE Gender='FEMALE' ;

*(½ Mark for SELECT Name FROM Worker)*

*(½ Mark for WHERE Gender ='FEMALE')*

- (iii) To display the Wno and Name of those workers from the table WORKER who are born between '1987-01-01' and '1991-12-01'.

Ans SELECT Wno, Name FROM Worker  
WHERE DOB BETWEEN '1987-01-01' AND '1991-12-01' ;

OR

SELECT Wno, Name FROM Worker  
WHERE DOB >='1987-01-01' AND DOB <='1991-12-01'

*(½ Mark for SELECT Wno, Name FROM Worker)*

*(½ Mark for*

WHERE DOB BETWEEN '1987-01-01' AND '1991-12-01'

OR

WHERE DOB >='1987-01-01' AND DOB <='1991-12-01')

- (iv) To count and display MALE workers who have joined after '1986-01-01' .

Ans    SELECT COUNT(\*) FROM Worker  
WHERE GENDER='MALE' AND DOJ > '1986-01-01';

OR

SELECT \* FROM Worker  
WHERE GENDER='MALE' AND DOJ > '1986-01-01';

*(Any valid query for counting and/or displaying for male workers will be awarded 1 mark)*

- (v)    SELECT COUNT(\*), DCODE FROM WORKER  
GROUP BY DCODE HAVING COUNT(\*)>1;

Ans    **COUNT(\*)**              **DCODE**  
2                                  D01  
2                                  D05

*(1/2 Mark for correct output)*

- (vi)    SELECT DISTINCT DEPARTMENT FROM DEPT;

Ans    Department  
MEDIA  
MARKETING  
INFRASTRUCTURE  
FINANCE  
HUMAN RESOURCE

*(1/2 Mark for correct output)*

(vii) SELECT NAME, DEPARTMENT, CITY FROM WORKER W,DEPT  
D WHERE W. DCODE=D.DCODE AND WNO<100 "3 ;

Ans	NAME	DEPARTMENT	CITY
	George K	MEDIA	DELHI
	Ryma Sen	INFRASTRUCTURE	MUMBAI

(1/2 Mark for correct output)

(viii) SELECT MAX(DOJ), MIN(DOB) FROM WORKER;

Ans	MAX(DOJ)	MIN(DOB)
	2014-06-09	1984-10-19

(1/2 Mark for correct output)

*Note: In the output queries, please ignore the order of rows*

6. (a) Verify the following using Boolean Laws.

2

$$x + y' = x \cdot y + x \cdot y' + x' \cdot y'$$

Ans L.H.S

$$= x + y'$$

$$= x \cdot (y + y') + (x + x') \cdot y'$$

$$= x \cdot y + x \cdot y' + x \cdot y' + x' \cdot y'$$

$$= x \cdot y + x \cdot y' + x' \cdot y'$$

= R.H.S

OR

R.H.S

$$= x \cdot y + x \cdot y' + x' \cdot y'$$

$$= x \cdot (y + y') + x' \cdot y'$$

$$= X \cdot 1 + X' \cdot Y'$$

$$= X + X' \cdot Y'$$

$$= X + Y'$$

$$= L.H.S$$

(2 Marks for any valid verification using Boolean Laws)

**OR**

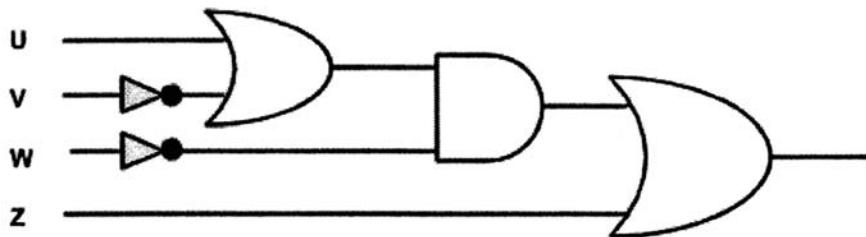
(1 Mark for partial correct verification using Boolean Laws)

- (b) Draw the Logic Circuit for the following Boolean Expression :

2

$$(U + V') \cdot W' + Z$$

Ans



(½ Mark for  $v'$  and  $W'$ )

(½ Mark for  $(U + V')$ )

(½ Mark for  $(U + V') \cdot W'$ )

(½ Mark for  $(U + V') \cdot W' + Z$ )

- (c) Derive a Canonical SOP expression for a Boolean function F, represented by the following truth table :

1

A	B	C	F(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1

1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans  $F(A,B,C) = A'B'C' + A'BC + AB'C' + ABC$

OR

$$F(A,B,C) = \sum (0,3,4,7)$$

(1 Mark for the correct SOP form)

OR

(VI Mark for writing any two term correctly)

Note: Deduct 1/2 mark if wrong variable names are used

- (d) Reduce the following Boolean Expression to its simplest form using K-Map :

3

$$F(X, Y, Z, W) = \sum (0, 1, 6, 8, 9, 10, 11, 12, 15)$$

Ans

	$X'Y'$	$X'Y$	$XY$	$XY'$
$Z'W'$	1		1	1
$Z'W$	1			1
$ZW$			1	1
$ZW'$		1		1

OR

	$Z'W'$	$Z'W$	$ZW$	$ZW'$
$X'Y'$	1	1		
$X'Y$				1
$XY$	1		1	
$XY'$	1	1	1	1

Simplified Expression:  $XV' + Y'Z' + XZ'W' + XZW + X'YZW'$

( $\frac{1}{2}$  Mark for each of grouping - 5 groups  $\times \frac{1}{2} = 2\frac{1}{2}$  Marks)

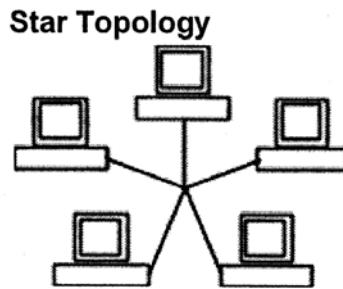
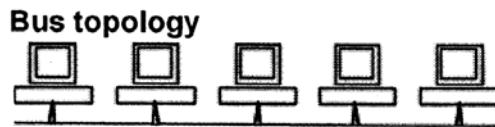
( $\frac{1}{2}$  Mark for writing final expression in reduced/minimal/non redundant form as  $XV' + Y'Z' + XZ'W' + XZW + X'YZW'$ )

Note: Deduct  $\frac{1}{2}$  mark if wrong variable names are used

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

1

Ans



OR any valid illustration of Bus and Star Topology.

( $\frac{1}{2}$  Mark for drawing each correct layout)

- (b) What is a spam mail ?

1

Ans Spam is the abuse of electronic messaging systems (including most broadcast media, digital delivery systems) to send unsolicited bulk messages indiscriminately.

(1 Mark for correct explanation)

- (c) Differentiate between ftp and http.

1

Ans FTP is a protocol to transfer files over the Internet

HTTP is a protocol which allows the use of HTML to browse web pages in the World Wide Web.

(1 Mark for any valid differentiation)

- (d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication?

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber

1

Ans (i) *Wired - Optical Fiber*

(ii) *Wireless - Infrared OR Microwave*

**(½ Mark each for Wired and Wireless medium of communication)**

- (e) What is Worm? How is it removed?

1

Ans A worm is a self-replicating computer program. It uses a network to send copies of itself to other computers on the network and it may do so without any user intervention.

Most of the common anti-virus(anti-worm) remove worm.

**(½ Mark for writing correct meaning of Worm)**

**(½ Mark for correct definition of removing Worm)**

- (f) Out of the following, which all comes under cyber crime?

- (i) Stealing away a brand new computer from a showroom.
- (ii) Getting in someone's social networking account without his consent and posting pictures on his behalf to harass him.
- (iii) Secretly copying files from server of a call center and selling it to the other organization.
- (iv) Viewing sites on a internet browser.

Ans (ii) & (iii)

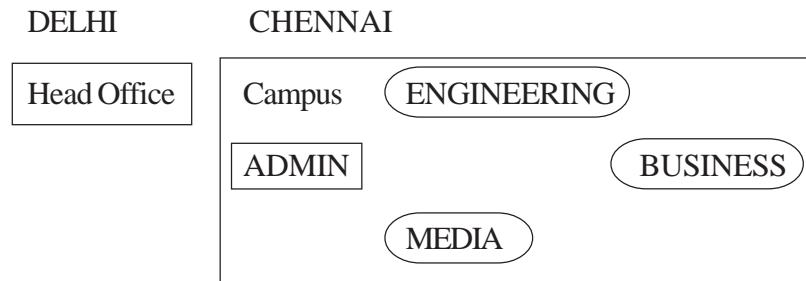
**(½ Mark for choosing each of the correct options)**

**Note:**

- *No marks to be given, if all options are there in the answer*
- *½ Mark to be deducted, if one extra option is given along with the correct options*

- (g) Perfect Edu Services Ltd. is an educational organization. It is planning to setup its India campus at Chennai with its head office at Delhi. The Chennai campus has 4 main buildings - ADMIN, ENGINEERING, BUSINESS and MEDIA.

You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various buildings :

ADMIN to ENGINEERING	55m
ADMIN to BUSINESS	90m
ADMIN to MEDIA	50m
ENGINEERING to BUSINESS	55m
ENGINEERING to MEDIA	50m
BUSINESS to MEDIA	45m
DELHI Head Office to CHENNAI Campus	2175 km

Number of Computers installed at various buildings are as follows :

ADMIN	110
ENGINEERING	75
BUSINESS	40
MEDIA	12
DELHI Head Office	20

- (i) Suggest the most appropriate location of the server inside the CHENNAI campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.

1

Ans **ADMIN** (due to maximum number of computers)

**OR**

**MEDIA** (due to shorter distance from the other buildings)

*(1 Mark for mentioning Correct building name with reason)*

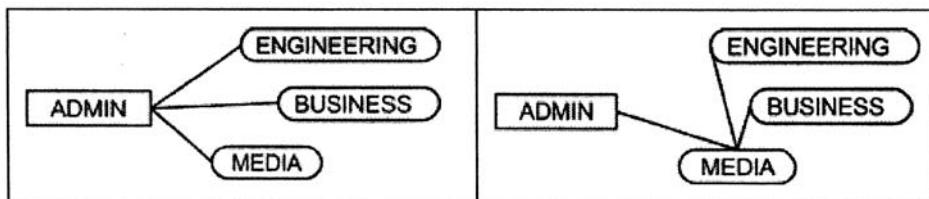
**OR**

*(1/2 Mark to be deducted for not giving reason)*

- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the CHENNAI campus for connecting the computers.

1

Ans Anyone of the following



*(1 Mark for drawing correct layout)*

- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus ?

1

Ans Firewall OR Router

*(1 Mark for correct Answer)*

- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of CHENNAI campus and DELHI Head Office?

1

- (a) Cable TV

- (b) Email
- (c) Video Conferencing
- (d) Text Chat

Ans Video Conferencing

**(1 Mark for correct Option / Answer)**

**QUESTION PAPER CODE 91**  
**EXPECTED ANSWERS**

**Section-A**  
**(Only for C++ Candidates)**

1. (a) Find the correct identifiers out of the following, which can be used for naming Variable, Constants or Functions in a C++ program : 2

For, while, INT, NeW, delete, 1stName, Add+Subtract, name1

Ans For, INT, NeW, name1

**(½ Mark for each correct identifier)**

**Note:**

- *Deduct ½ Mark for writing additional incorrect identifier(s)*
- *No marks to be awarded if all the identifiers are mentioned*

- (b) Observe the following program very carefully and write the names of those header files, which are essentially needed to compile and execute the following program successfully : 1

```
typedef char STRING[80];

void main()
{
    STRING Txt [] = "We love Peace";
```

```

int Count=0;

while (Txt[Count] != '\0')

    if (isalpha(Txt[Count]))

        Txt[Count++] = '@';

    else

        Txt[Count++] = '#';

puts(Txt);

}

```

Ans ctype, stdio

*(1/2 mark for each header file)*

**Note: Ignore any additional header file(s)**

- (c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all required header files are already being included in the program.

```

#define float MaxSpeed=60.5;

void main()

{
    int MySpeed

    char Alert='N' ;

    cin>>MySpeed;

    if MySpeed>MaxSpeed

        Alert=' Y' ;

    cout<<Alert<<endl;
}

```

```

Ans #define float MaxSpeed_60.5 ; //Error 1,2,3

void main ()
{
    int MySpeed ; //Error 4
    char Alert='N' ;
    cin>>MySpeed;
    if (MySpeed>MaxSpeed) //Error 5
        Alert=' Y' ;
    cout<<Alert<<endl ; //Error 6
}

```

*(1/2 Mark for each correction upto a maximum of 4 corrections)*

**OR**

*(1 mark for only identifying any 4 errors, without suggesting corrections).*

- (d) Write the output of the following C++ program code:

2

Note : Assume all required header files are already being included in the program.

```

void Location(int &X, int Y=4)

{
    Y+=2;
    X+=Y;
}

void main ()
{

```

```

int PX=10 , PY=2 ;

Location (PY) ;

cout<<PX<<" , "<<PY<<endl ;

Location(PX, PY) ;

cout<<PX<<" , "<<PY<<endl ;

}

```

Ans 10,8

20,8

*(½ Mark for each correct value)*

**Note:**

- **Deduct ½ Mark for not considering any or all end/(s) at proper place(s)**
- **Deduct ½ Mark for not considering any or all ',' at proper place(s)**

(e) Write the output of the following C++ program code:

3

Note: Assume all required header files are already being included in the program.

```

class Eval

{

    char Level;

    int Point;

public:

    Eval() {Level='E'; Point=0; }

    void Sink(int L)

    {

        Level-=L;

```

```

    }

void Float(int L)

{
    Level+=L;
    Point++;
}

void Show()

{
    cout<<Level<<"#"<<Point<<endl;
}

} ;

void main ()

{
    Eval E;

    E.Sink(3);

    E.Show();

    E.Float(7);

    E.Show();

    E.Sink(2);

    E.Show();

}

```

Ans B#0  
1#1  
G#1

*(1 Mark for each correct line of output)*

*Note:*

- *Deduct ½ Mark for not considering any or all end/(s) at proper place(s)*
- *Deduct ½ Mark for not writing any or all # symbol(s)*

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable VAL.

2

*Note:*

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n-1.

```
void main ()  
{  
    randomize();  
    int VAL;  
    VAL=random(3) +2;  
    char GUESS[ ]="ABCDEFGHIJK";  
    for (int I=1;I<=VAL; I++)  
    {  
        for(int J=VAL; J<=7;J++)  
            cout<<GUESS [J] ;  
        cout<<endl;  
    }  
}
```

(i)	(ii)	(iii)	(iv)
BCDEFGH	CDEFGH	EFGH	FGHI
BCDEFGH	CDEFGH	EFGH	FGHI
		EFGH	FGHI
		EFGH	FGHI

Ans (ii) and (iii)

Min Value of VAL = 2

Max Value of VAL = 4

(½ Mark for writing option (ii) )

(½ Mark for writing option (iii) )

**Note:**

- **Deduct ½ mark for writing each additional option along with both correct options**

(½ Mark for writing correct Minimum value of VAL)

(½ Mark for writing correct Maximum value of VAL)

2. (a) What is a copy constructor ? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.

2

Ans A copy constructor is an overloaded constructor in which an object of the same class is passed as reference parameter.

```
class Point
{
    int x;
public:
```

```

Point () {x=0; }

Point(Point &p) // Copy constructor

{x=p.x; }

} ;

void main ()

{

Point p1;

Point p2(p1); //Copy constructor is called here

//OR

Point p3=p1; //Copy constructor is called here

}

```

**(1½ Mark to be awarded if the copy constructor is explained with an appropriate example)**

**OR**

**(1 Mark for correct explanation of copy constructor only without an example)**

**(½ Mark for correct declaration of an object)**

- (b) Observe the following C++ code and answer the questions (i) and (ii) :

```

class Passenger

{

    long PNR;

    char Name [201] ;

public:

    Passenger () //Function 1

    { cout<<"Ready"<<endl; }

```

```

void Book(long P,char N[])
//Function 2

{ PNR = P; strcpy (Name, N) ; }

void Print () //Function 3

{ cout<<PNR << Name << endl; }

~Passenger () //Function 4

{ cout<<"Booking cancelled! "<< endl; }

} ;

```

- (i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code : 1

```

void main()

{

    Passenger P;

    _____ //Line 1

    _____ //Line 2

} //Ends here

```

Ans P. Book (1234567, "Ravi"); //Line 1

P.Print(); //Line 2

**(½ Mark for writing each correct Function)**

- (ii) Which function will be executed at } //Ends here? What is this function referred as ? 1

Ans Function 4

OR

~Passenger ()

It is a Destructor function.

*(1/2 Mark for writing Function 4 OR ~Passenger())*

*(1/2 Mark for referring Destructor)*

- (c) Write the definition of a class Photo ill C++ with following description: 4

Private Members

- Pno //Data member for Picture Number (an integer)
- Category//Data member for Picture Category (a string)
- Location//Data member for Exhibition Location (a string)
- FixLocation //A member function to assign

//Exhibition Location as per category

//as shown in the following table

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

Public Members

- Enter() //A function to allow user to enter values
  - //Pno, category and call FixLocation() function
- SeeAll() //A function to display all the data members

Ans class Photo

```
{  
    int Pno;  
  
    char Category[20];  
  
    char Exhibit[20];  
  
    void FixExhibit();
```

```

public:

void Register() ;

void ViewAll();

} ;

void Photo::FixExhibit()

{

if (strcmpi (Category, "Antique") ==0)

strcpy(Exhibit,"Zaveri");

else if(strcmpi(Category, "Modern")==0)

strcpy(Exhibit, "Johnsen") ;

else if strcmpi(Category, "Classic")==0

strcpy(Exhibit, "Terenida") ;

}

void Photo::Register()

{

cin>>Pno;

gets (Category) ;

FixExhibit();

}

void Photo:: ViewAll()

{

cout<<Pno<<Category<<Exhibit<<endl;

}

```

*(1/2 Mark for correct syntax for class header)*

*(1/2 Mark for correct declaration of data members)*

*(1 Mark for correct definition of FixExhibit))*

*(1 Mark for correct definition of Register()) with proper invocation of FixExhibit() function)*

*(1 Mark for correct definition of ViewAll())*

**NOTE:**

- *Deduct 1/2 Mark if FixExhibit() is not invoked properly inside Register() function*
- *No marks to be deducted for defining Member Functions inside the class*
- *strcmp()/strcmpi() acceptable*

(d) Answer the questions (i) to (iv) based on the following:

4

```
class Interior

{
    int OrderId;
    char Address[20];

protected:
    float Advance;

public:
    Interior();
    void Book(); void View();
} ;

class Painting:public Interior
```

```

{
    int WallArea, ColorCode;

protected:
    char Type;

public:
    Painting () ;
    void PBook();
    void PView();
} ;

class Billing : public Painting
{
    float Charges;
    void Calculate();

public:
    Billing();
    void Bill();
    void BillPrint();
} ;

```

(i) Which type of Inheritance out of the following is illustrated in the above example?

- Single Level Inheritance
- Multi Level Inheritance
- Multiple Inheritance

Ans Multi Level Inheritance

**(1 Mark for mentioning correct option)**

- (ii) Write the names of all the data members, which are directly accessible from the member functions of class Painting.

Ans WallArea, ColorCode, Type, Advance

**(1 Mark for correct answer)**

**Note:**

- **No marks to be awarded for any partial or additional answer(s)**
- (iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.

Ans Bill(), BillPrint(), PBook(), PView(), Book(), View()

**(1 Mark for correct answer)**

**Note: No marks to be awarded for any partial/additional answer(s)**

- **Constructors can be ignored**
- (iv) What will be the order of execution of the constructors, when an object of class Billing is declared ?

Ans Interior, Painting, Billing

**(1 Mark for correct answer)**

**Note: No marks to be awarded for any other order**

3. (a) Write the definition of a function Change (int P[], int N) in C++, which should change all the multiples of 10 in the array to 10 and rest of the elements as 1.

For example, if an array of 10 integers is as follows:

2

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
100	43	20	56	32	91	80	40	45	21

After executing the function, the array content should be changed as follows:

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
10	1	10	1	1	1	10	10	1	1

Ans void Change (int P[ ], int N)

```
{
    for (int i=0;i<N;i++)
        if(P[i]%10==0)
            P[i]=10;
        else
            P[i]=1;
}
```

**OR**

**Any other correct equivalent function definition**

*(1/2 Mark for correct loop)*

*(1/2 Mark for correct checking of divisibility of array elements by 10)*

*(1/2 Mark for correct use of else OR correct checking of non divisibility of array elements by 10 )*

*(1/2 Mark for correct assignment of 10 and 1 for multiples and non multiples of 10 respectively)*

- (b) A two dimensional array ARR[50][20] is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[30][10], if the element ARR[10][5] is stored at the memory location 15000.

3

Ans Loc (ARR[I][J]) along the row

$$= \text{BaseAddress} + W [ (I - LBR) * C + (J - LBC) ]$$

(where C is the number of columns, LBR = LBC = 0

```

LOC (ARR[10] [5])
= BaseAddress + W [I*C + J]

15000 = BaseAddress + 4[10*20 + 5]
= BaseAddress + 4[200 + 5]
= BaseAddress + 4 x 205
= BaseAddress + 820

BaseAddress = 15000 - 820
= 14180

LOC (ARR[30] [10]) = 14180 + 4 [30 * 20 + 10]
= 14180 + 4 * 610
= 14180 + 2440
= 16620

```

OR

```

LOC (ARR[30] [10])
= LOC (ARR[10] [5]) + W[ ( I-LBR ) *C + ( J-LBC ) ]
= 15000 + 4 [ (30-10) *20 + (10-5) ]
= 15000 + 4[ 20*20 + 5]
= 15000 + 4 *405
= 15000 + 1620
= 16620

```

OR

Where C is the number of columns and LBR=LBC=1

```

LOC (ARR[10] [5])
15000 = BaseAddress + W [ ( I-I ) *C + ( J-1 ) ]

```

$$\begin{aligned}
 &= \text{BaseAddress} + 4[9*20 + 4] \\
 &= \text{BaseAddress} + 4[180 + 4] \\
 &= \text{BaseAddress} + 4 * 184 \\
 &= \text{BaseAddress} + 736 \\
 \text{BaseAddress} &= 15000 - 736 \\
 &= 14264 \\
 \text{LOC(ARR[30][10])} \\
 &= 14264 + 4[(30-1)*20 + (10-1)] \\
 &= 14264 + 4[29*20 + 9] \\
 &= 14264 + 4[580 + 9] \\
 &= 14264 + 4*589 \\
 &= 14264 + 2356 \\
 &= 16620
 \end{aligned}$$

*(1 Mark for writing correct formula (for row major) OR substituting formula with correct values)*

*( 1 Mark for at least one step of intermediate calculation)*

*( 1 Mark for final correct address)*

- (c) Write the definition of a member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program :

4

```

struct BOOKS
{
    char ISBN[20], TITLE[80];
    BOOKS *Link;
} ;

```

```

class STACK
{
    BOOKS *Top;

public:
    STACK() {Top=NULL; }

    void PUSH();
    void POP();
    ~STACK();
}
;
```

Ans void STACK: :PUSH()

```

{
    BOOKS *Temp;
    Temp=new BOOKS;
    gets (Temp->1SBN);
    gets (Temp->T1ITLE);
    Temp->Link=Top;
    Top=Temp;
}
```

**OR**

**Any other correct equivalent function definition**

*(1 Mark for creating a new node of BOOKS dynamically)*

*(1/2 Mark for entering value of ISBN)*

*(1/2 Mark for entering value of TITLE)*

*(1 Mark for linking the new node of BOOKS to the Top)*

*(1 Mark for making the new node of BOOKS as Top)*

- (d) Write a function REVROW(int P[ ][5],int N,int M) in C++ to display the content of a two dimensional array, with each row content in reverse order.

3

For example, if the content of array is as follows :

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as

```
51  45  56  12  15  
63  87  92  91  13  
81  46  61  23  81
```

Ans void REVROW(int P[ ] [5], int N, int M)

```
{  
  
    for(int I=0; I<N; I++)  
    {  
        for(int J=M-1; J>=0; J--)  
            cout<<P[I] [J] ;  
  
        cout<<endl;  
    }  
}
```

OR

```
void REVROW(int P[ ] [5], int N, int M)  
{  
  
    for(int I=0; I<N; I++)  
    {  
        for(int J=M-1; J>=0; J--)  
            cout<<P[I] [J] ;  
  
        cout<<endl;  
    }  
}
```

```

for(int J=0; J<M/2; J++)
{
    int T = P[1][J];
    P[I][J] = P[1][M-J-1];
    P[I][M-J-1] = T;
}

for (I=0 i 1<N; I++)
{
    for (int J=0; J<M; J++)
        cout<<P[I][J];
    cout<<endl;
}

```

*(1 Mark for correct nesting of loop(s))*

*(1½ Mark for correct logic for reversing the content of each row)*

*(½ Mark for correctly displaying the content)*

**Note: N and M can be written interchangeably for number of rows and columns**

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion :

2

U \* V + R / (S-T)

Ans U \* V + R / (S-T)

$$= ((U * V) + (R / (S-T)))$$

Element	Stack	Postfix
(		
(		
U		U
*	*	
V		UV
)		UV*
+	+	
(		
R		UV*R
/	+ /	
(		
S		UV*RS
-	+ / -	
T		UV*RST
)		UV*RST-
)		UV*RST- /
)		UV*RST- / +

OR

Element	Stack	Postfix
U		U
*	*	U
V	*	UV

+	+	$UV^*$
R	+	$UV^*R$
/	+ /	$UV^*R$
(	+ / (	$UV^*R$
S	+ / (	$UV^*RS$
-	+ / ( -	$UV^*RS$
T	+ / ( -	$UV^*RST$
)	+ /	$UV^*RST-$
	+	$UV^*RST-/$
		$UV^*RST-/ +$

**OR**

**Any other method for converting the given Infix expression to its equivalent Postfix expression showing stack contents**

*(1/2 mark for converting expression up to each operator)*

**OR**

*(1 mark to be given for writing correct answer without showing the stack content)*

4. (a) Write function definition for TOWER() in C++ to read the content of a text file WRITEUP.TXT, count the presence of word TOWER and display the number of occurrences of this word.

2

Note:

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example:

If the content of the file WRITEUP.TXT is as follows :

Tower of hanoi is an interesting problem. Mobile phone tower is away from here. Views from EIFFEL TOWER are amazing.

The function TOWER() should display the following:

3

Ans void TOWER()

```
{  
    int count=0;  
  
    ifstream f ("WRITEUP.TXT") ;  
  
    char s[20];  
  
    while (! f .eof ())  
    {  
        f>>s;  
  
        if (strcmpi (s, "TOWER") ==0)  
            count++;  
    }  
  
    cout<<count;  
  
    f. close () ;  
}
```

**OR**

**Any other correct function definition**

*(1/2 Mark for opening WRITEUP. TXT correctly)*

*(1/2 Mark for reading each word (using any method) from the file)*

(*1/2 Mark for comparing the word with TOWER*)

(*1/2 Mark for displaying correct count of TOWER*)

**NOTE:**

(*1/2 Mark to be deducted if TOWER is compared without ignoring the case*)

- (b) Write a definition for function COSTLY() in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below:

3

```
class GIFTS

{
    int CODE;char ITEM[20]; float PRICE;

public:
    void Procure ()
    {
        cin>>CODE; gets (ITEM);cin>>PRICE;
    }

    void View()
    {
        cout<<CODE<<" : "<<ITEM<<" : "<<PRICE<<endl;
    }

    float GetPrice() {return PRICE; }.

} ;
```

```

Ans void COSTLY( )

{
    GIFTS G;

    ifstream fin("GIFTS.DAT",ios::binary);

    while (fin.read(char *)&G,sizeof(G)))
    {
        if (G.GetPrice ()>2000)
            G.View();

    }

    fin.close ();
}

```

## OR

**Any other correct equivalent function definition**

(*1/2 Mark for opening GIFTS.DAT correctly*)

(*1 Mark for reading all records from the file*)

(*1 Mark for checking value of PRICE > 2000 )*

(*1/2 Mark for displaying the desired items*)

- (c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members:

1

```

class MEMBER

{
    int Mno; char Name[20];

public:
    void In();void Cut();

```

```

} ;

void main()
{
fstream MF;

MF.open ( "MEMBER. DAT", ios:: binary|ios::in);

MEMBER M;

MF.read( (char*)&M, sizeof(M) );

MF.read( (char*)&M, sizeof(M) );

MF.read( (char*)&M, sizeof(M) );

int POSITION= MF.tellg()/sizeof(M);

cout<< " PRESENT RECORD: "<<POSITION<<endl;

MF.close();

}

```

Ans PRESENT RECORD: 3

**(1 Mark for writing PRESENT RECORD: 3)**

**OR**

**(1 Mark for writing only 3)**

**OR**

**(½ Mark for writing only PRESENT RECORD:)**

### Section - B

**(Only for Python candidates)**

1. (a) How is \_\_init\_\_ different from \_\_del\_\_?

2

Ans \_\_init\_\_ () is the class constructor or initialization method which is automatically invoked when we create a new instance of a class.

`__del__()` is a destructor which is automatically invoked when an object (instance) goes out of scope.

For Example:

```
class Sample:  
  
    def __init__(self):  
        self.data = 79  
        print('Data:', self.data, 'created')  
  
    def __del__(self):  
        print('Data:', self.data, 'deleted')  
  
s = Sample()  
  
del s
```

(2 Marks for correct differentiation)

OR

(2 Marks for differentiation through example)

OR

(1 Mark for each correct definition)

- (b) Name the function/method required to 1  
(i) check if a string contains only alphabets  
(ii) give the total length of the list

Ans `isalpha()`

`len()`

(1/2 Mark for each correct function/ method name)

- (c) Rewrite the following code in python after removing all syntax error(s).  
Underline each correction done in the code. 2

`def Sum(Count) #Method to find sum`

```

S=0

for I in Range (1,Count+1) :

    S+=I

RETURN S

print Sum[2]      #Function Call

print Sum[5]

Ans def Sum(Count) __: #Method to find sum      #Error 1

S=0

for I in range (1,Count+1):                      #Error 2

    S+=I

return S                                         #Error 3

print Sum (2) #Function Call                  #Error 4

print Sum (5)                                     #Error 4

(1/2 Mark for each correction)

```

**OR**

**(1 mark for identifying all the errors, without suggesting corrections)**

- (d) Find and write the output of the following python code:

2

```

for Name in ['John', 'Garima', 'Seema', 'Karan']:

    print Name

    if Name[0]='S':

        break

else:

    print 'Completed!'

print 'Welldone!'

```

Ans John

Garima

Seema

Weldone!

( $\frac{1}{2}$  Mark for each correct line)

**Note:**

**Deduct  $\frac{1}{2}$  Mark for not considering any or all line breaks at proper place(s)**

- (e) Find and write the output of the following python code:

3

```
class Emp:

    def __init__(self, code, nm): #constructor

        self.Code=code

        self.Name=nm

    def Manip(self) :

        self.Code=self.Code+10

        self.Name='Karan'

    def Show (self,line) :

        print self.Code, self.Name, line

s=Emp (25, 'Mamta')

s.Show(1)

s.Manip()

s.Show(2)

print s.Code+1+ len(s.Name)
```

Ans 25 Mamta 1

35 Karan 2

40

**(1 Mark for each correct line)**

**Note:**

**Deduct ½ Mark for not considering any or all line break(s) at proper place(s).**

- (f) What are the possible outcome(s) executed from the following code?  
Also specify the maximum and minimum values that can be assigned to variable COUNT.

2

```
TEXT="CBSEONLINE"  
  
COUNT=random.randint(0,3)  
  
C=9  
  
while TEXT[C] != 'L' :  
  
    print TEXT[C]+TEXT[COUNT]+'*',  
  
    COUNT=COUNT+1
```

C=C-1

(i) (ii) (iii) (iv)

EC\*NB\*IS\* NS\*IE\*LO\* ES\*NE\*IO\* LE\*NO\*ON\*

Ans (i) EC\*NB\*IS\*

(iii) ES\*NE\*IO\*

Minimum COUNT = 0      Maximum COUNT = 3

**(½ Mark for writing option (i) )**

**(½ Mark for writing option (iii) )**

*Note:*

- *Deduct V2 mark for writing each additional option along with both correct options*

*(1/2 Mark for writing correct Minimum value of COUNT)*

*(1/2 Mark for writing correct Maximum value of COUNT)*

2. (a) Illustrate the concept inheritance with the help of a python code.

2

Ans class Base:

```
def __init__(self) :  
    print "Base Constructor at work ... "  
  
def show(self) :  
    print "Hello Base"  
  
class Der(Base) :  
  
    def __init__(self) :  
        print "Derived Constructor at work ... "  
  
    def display(self) :  
        print "Hello from Derived"
```

*(1 Mark for base class)*

*(1 Mark for derived class)*

- (b) What will be the output of the following python code ? Explain the try and except used in the code.

2

A=0

B=6

```
print 'One'
```

```
try:
```

```

print 'Two'

X=B/A

Print 'Three'

except ZeroDivisionError:

    print B*2

    print 'Four'

except:

    print B*3

    print 'Five'

```

Ans One

Two

12

Four

The code written within try triggers the exception written after except ZeroDivisionError: in case there is a division by zero error otherwise the default exception is executed

OR

Any other correct explanation for usage of try and except

*(1/2 Mark for first two lines of correct output)*

*(1/2 Mark for next two lines of correct output)*

*(1/2 Mark each for correct explanation of try and except)*

- (c) Write a class PHOTO in Python with following specifications:

4

Instance Attributes

- Pno # Numeric value
- Category # String Value

```
- Exhibit # Exhibition Gallery with String value
```

Methods :

```
- FixExhibit() #A method to assign  
#Exhibition Gallery as per Category  
#as shown in the following table
```

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

```
- Register() #A function to allow user  
#to enter values of Pno, Category  
#and call FixExhibit() method  
- ViewAll() #A function to display all the data  
#members
```

Ans class PHOTO:

```
Pno=0  
Category=" "  
Exhibit=" "  
def FixExhibit() :  
    if self.Category=="Antique":  
        self.Exhibit="Zaveri"  
    elif self.Category=="Modern": -  
        self.Exhibit="Johnsen"  
    elif self.Category=="Classic":  
        self.Exhibit="Terenida"
```

```

def Register () :

    self.Pno=int(input("Enter Pno:"))

    self.Category=input ("Enter Name: ")

    self.FixExhibit()

def ViewAll():

    print self.pno,self.Category,self.Exhibit

```

*(1/2 Mark for correct syntax for class header)*

*(1/2 Mark for correct declaration of instance attributes)*

*(1 Mark for correct definition of FixExhibit())*

*(1 Mark for correct definition of Register() with proper invocation of FixExhibit() method)*

*(1 Mark for correct definition of ViewAll())*

**NOTE:**

*Deduct 1/2 Mark if FixExhibit() is not invoked properly inside Register() method*

- (d) What is operator overloading with methods? Illustrate with the help of an example using a python code.

2

Ans Operator overloading is an ability to use an operator in more than one form.

Examples:

In the following example operator + is used for finding the sum of two integers:

```

a = 7

b = 5

print (a+b) # gives the output: 12

```

Whereas in the next example, shown below the same + operator is used to add two strings:

```

a = 'Indian'

b = 'Government'

print (a+b) # # gives the output: Indian
Government

```

**(1 Mark for correct definition of Operator overloading)**

**(1 Mark for correct example of Python code to illustrate Operator overloading)**

- (e) Write a method in python to display the elements of list twice, if it is a number and display the element terminated with '\*' if it is not a number.

2

For example, if the content of list is as follows :

```
MyList=[ 'RAMAN' , '21' , 'YOGRAJ' , '3' , 'TARA' ]
```

The output should be

RAMAN \*

2121

YOGRAJ\*

33

TARA\*

Ans def fun(L) :

```
    for I in L:
```

```
        if I.isnumeric():
```

```
            print(2*I) # equivalently: print (I+I)
```

```
        else:
```

```
            print(I+'*')
```

**(1/2 Mark for correct loop)**

**(1/2 Mark for checking numeric/non numeric)**

**(1/2 Mark for displaying numeric content)**

**(1/2 Mark for displaying numeric content)**

3. (a) What will be the status of the following list after fourth pass of bubble sort and fourth pass of selection sort used for arranging the following elements in descending order?

3

34, -6, 12, -3, 45, 25

Ans Bubble Sort

34, -6, 12, -3, 45, 25 (Original Content)

- i. 34, 12, -3, 45, 25, -6
- ii. 34, 12, 45, 25, -3, -6
- iii. 34, 45, 25, 12, -3, -6
- iv. 45, 34, 25, 12, -3, -6

Selection Sort

34, -6, 12, -3, 45, 25 (Original Content)

- i. 45, -6, 12, -3, 34, 25
- ii. 45, 34, 12, -3, -6, 25
- iii. 45, 34, 25, -3, -6, 12
- iv. 45, 34, 25, 12, -6, -3 (Unsorted status after 4th pass)

**For Bubble Sort**

(1½ Mark if (iv) pass is correct)

**OR**

(½ Mark for (i) pass)

(½ Mark for (ii) pass)

(½ Mark for (iii) pass)

**For Selection Sort**

(1½ Mark if (iv) pass is correct)

**OR**

( $\frac{1}{2}$  **Mark for (i) pass**)

( $\frac{1}{2}$  **Mark for (ii) pass**)

( $\frac{1}{2}$  **Mark for (iii) pass**)

- (b) Write a method in python to search for a value in a given list (assuming that the elements in list are in ascending order) with the help of Binary Search method. The method should return -1, if the value not present else it should return position of the value present in the list.

2

Ans def bSearch(L, key) :

```
    low = 0
    high = len(L)-1
    found = False
    while (low <= high) and (not found) :
        mid = (low<=high)//2
        if L[mid] == key:
            found = True
        elif L[mid] < key:
            low = mid + 1
        else:
            high = mid - 1
    if found:
        return mid+1 # may even be 'return mid'
    else:
        return -1
```

( $\frac{1}{2}$  **Mark for correct Initialization of lower and upper bounds**)

*(1/2 Mark for correct loop)*

*(1/2 Mark for reassigning Mid,Low,Up bound)*

*(1/2 Mark for returning correct value)*

- (c) Write PUSH(Names) and POP(Names) methods in python to add Names and Remove names considering them to act as Push and Pop operations of Stack.

4

```
Ans def push (Name) :  
    Stack. append (Name)  
    print 'Element: ', Name, ' inserted successfully'  
  
def pop () :  
  
    if Stack == [] :  
        print (' Stack is empty! ')  
  
    else:  
        print ('Deleted element is', Stack.pop ())
```

*(2 Marks for correctly pushing an element into the stack)*

*(1 Mark for checking empty stack in POP())*

*(1 Mark for popping element from stack)*

- (d) Write a method in python to find and display the composite numbers between 2 to N. Pass N as argument to the method.

3

```
Ans def composite_numbers (N):
```

```
    for I in range (2, N+1):  
        M = I // 2  
  
        for J in range(2, M+1):  
            if I % J == 0:  
                print (I)  
  
                break
```

**OR**

**Any other correct equivalent method definition**

**(1 Mark for correct loops)**

**(1 Mark for checking composite numbers between 2 to N)**

**(1 Mark for displaying the numbers)**

- (e) Evaluate the following postfix notation of expression. Show status of stack after every operation.

2

$34, 23, +, 4, 5, *, -$

Ans	Element	Stack
	34	34
	23	34, 23
	+	57
	4	57, 4
	5	57, 4, 5
	*	57, 20
		- 37

**(1 mark for evaluating till 57)**

**(1/2 mark for evaluating till 57, 20)**

**(1/2 mark for evaluating till final 37)**

**Note:**

***Only 1 mark to be awarded for evaluating final answer as 37 without showing stack contents***

4. (a) Differentiate between the following :

1

- (i) `f = open ('diary.txt', 'a')`
- (ii) `f = open ('diary.txt', 'w')`

Ans (i) diary.txt is opened for writing data at the end of file

- (ii) diary.txt is opened for writing data from the beginning of file in create mode

*(1 mark for writing correct difference)*

*OR*

*(1/2 Mark for each correct explanation of (i) and (ii))*

(b) Write a method in python to read the content from a text file story.txt line by line and display the same on screen.

2

Ans `def read_file () :`

```
    inFile = open('story.txt', 'r' )  
    for line in inFile:  
        print line
```

*(1/2 Mark for opening the file)*

*(1 Mark for reading all lines)*

*(1/2 Mark for displaying all lines)*

(c) Consider the following definition of class Student. Write a method in python to write the content in a pickled file student.dat.

3

`class Student:`

```
    def __init__(self,A,N) :  
        self.Admno=A  
        self.Name=N  
  
    def Show (self) :  
        print (self.Admno, "#", self . Name)
```

```

Ans import pickle

class Student:

    def __init__(self, A, N):
        self.Admno = A
        self.Name = N

    def show(self):
        print(self.Admno, "#", self.Name)

    def store_data(self):
        piFile = open('student.dat', 'wb')
        pickle.dump(self, piFile)
        piFile.close()

```

*(1 Mark for method header)*

*(1 Mark for opening the file student.dat in correct mode)*

*(1 Mark each for writing student details into the file)*

## SECTION C

**[For all candidates]**

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key:

2

Code	Item	Qty	Price	Transaction Date
1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

Ans Candidate keys : Code, Item

Primary keys : Code

(**1 Mark for writing correct Candidate keys**)

(**1 Mark for writing correct Primary key**)

*Note:*

*No marks to be deducted for mentioning Price and/or*

*Transaction Date as additional candidate keys.*

- (b) Consider the following DEPT and EMPLOYEE tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii).

6

Table : DEPT

DCODE	DEPARTMENT	LOCATION
D01	INFRASTRUCTURE	DELHI
D02	MARKETING	DELHI
D03	MEDIA	MUMBAI
D05	FINANCE	KOLKATA
D04	HUMAN RESOURCE	MUMBAI

Table : EMPLOYEE

ENO	NAME	DOJ	DOB	GENDER	DCODE
1001	George K	2013-09-02	1991-09-01	MALE	D01
1002	Ryma Sen	2012-12-11	1990-12-15	FEMALE	D03
1003	Mohitesh	2013-02-03	1987-09-04	MALE	D05
1007	Anil Jha	2014-01-17	1984-10-19	MALE	D04
1004	Manila Sahai	2012-12-09	1986-11-14	FEMALE	D01
1005	R SAHAY	2013-11-18	1987-03-31	MALE	D02
1006	Jaya Priya	2014-06-09	1985-06-23	FEMALE	D05

Note: DOJ refers to date of joining and DOB refers to date of Birth of employees.

- (i) To display Eno, Name, Gender from the table EMPLOYEE in ascending order of Eno.

Ans SELECT Eno, Name, Gender FROM Employee  
ORDER BY Eno;

(*1/2 Mark for SELECT Eno, Name, Gender FROM Employee*)

(*1/2 Mark for ORDER BY Eno*)

- (ii) To display the Name of all the MALE employees from the table EMPLOYEE.

Ans SELECT Name FROM Employee WHERE Gender='MALE' ;

(*1/2 Mark for SELECT Name FROM Employee*)

(*1/2 Mark for WHERE Gender='MALE'*)

- (iii) To display the Eno and Name of those employees from the table EMPLOYEE who are born between '1987-01-01' and '1991-12-01'.

Ans SELECT Eno, Name FROM Employee  
WHERE DOB BETWEEN '1987-01-01' AND '1991-12-01'

OR

SELECT Eno, Name FROM Employee  
WHERE DOB >='1987-01-01' AND DOB <='1991-12-01' ;

OR

SELECT Eno, Name FROM Employee  
WHERE DOB >'1987-01-01' AND DOB <'1991-12-01' ;

(*1/2 Mark for SELECT Eno, Name FROM Employee*)

(*1/2 Mark for*

WHERE DOB BETWEEN '1987-01-01' AND '1991-12-01'

OR WHERE DOB >='1987-01-01' AND DOB <='1991-12-01'

OR WHERE DOB >'1987-01-01' AND DOB <'1991-12-01')

- (iv) To count and display FEMALE employees who have joined after '1986-01-01'.

Ans SELECT count(\*) FROM Employee

WHERE GENDER='FEMALE' AND DOJ > '1986-01-01' ;

OR

SELECT \* FROM Employee

WHERE GENDER='FEMALE' AND DOJ > '1986-01-01' ;

*(Any valid query for counting and/or displaying for female employees will be awarded 1 mark)*

- (v) SELECT COUNT(\*), DCODE FROM EMPLOYEE  
GROUP BY DCODE HAVING COUNT(\*)>1;

Ans COUNT      DCODE

2                D01

2                D05

*(1/2 Mark for correct output)*

- (vi) SELECT DISTINCT DEPARTMENT FROM DEPT;

Ans Department

INFRASTRUCTURE

MARKETING

MEDIA

FINANCE

HUMAN RESOURCE

*(1/2 Mark for correct output)*

(vii) SELECT NAME, DEPARTMENT FROM EMPLOYEE E, DEPT D  
 WHERE E.DCODE=D.DCODE AND ENO<1003;

Ans	<u>NAME</u>	<u>DEPARTMENT</u>
	George K	INFRASTRUCTURE
	Ryma Sen	MEDIA

*(1/2 Mark for correct output)*

(viii) SELECT MAX (DOJ), MIN (DOB) FROM EMPLOYEE;

Ans	<u>MAX (DOJ)</u>	<u>MIN(DOB)</u>
	2014-06-09	1984-10-19

*(1/2 Mark for correct output)*

*Note: In the output queries, please ignore the order of rows.*

6. (a) Verify the following using Boolean Laws:

2

$$U' + V = U'V' + U' \cdot V + U \cdot V$$

Ans L.H.S

$$=U' + V$$

$$=U' \cdot (V + V') + V \cdot (U' + U)$$

$$=U' \cdot V + U' \cdot V' + U' \cdot V + U \cdot V$$

$$=U' \cdot V + U' \cdot V' + U \cdot V$$

=R.H.S

OR

R.H.S

$$=U' \cdot V' + U' \cdot V + U \cdot V$$

$$=U' \cdot (V' + V) + U \cdot V$$

$$=U' \cdot 1 + U \cdot V$$

$$=U' + U \cdot V$$

$$= U' + V$$

= L.H.S

*(2 Marks for any valid verification using Boolean Laws)*

**OR**

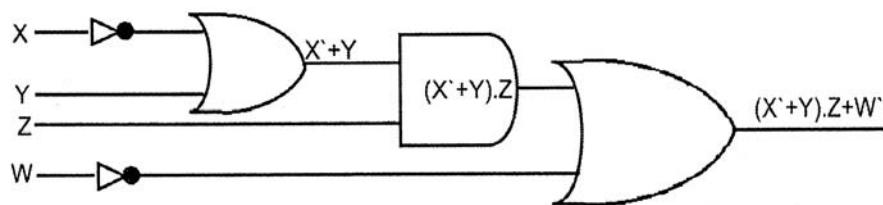
*(1 Mark for partial correct verification using Boolean Laws)*

- (b) Draw the Logic Circuit for the following Boolean Expression :

2

$$(X' + Y) \cdot Z + W'$$

Ans



*(1/2 Mark for X' and W')*

*(1/2 Mark for (X' + Y))*

*(1/2 Mark for (X' + Y) · Z)*

*(1/2 Mark for (X' + Y) · Z + W')*

- (c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table :

1

p	Q	R	F(P,Q,R)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans  $F(P,Q,R) = (P+Q+R')(P+Q'+R)(P'+Q+R')(P'+Q'+R)$

OR

$$F(P,Q,R) = \Pi(1,2,5,6)$$

*(1 Mark for the correct POS form)*

*OR*

*(1/2 Mark for writing any two term correctly)*

*Note: Deduct 1/2 mark if wrong variable names are used*

- (d) Reduce the following Boolean Expression to its simplest form using K-Map:

3

$$F(X,Y,Z,W) = \Sigma(0,1,4,5,6,7,8,9,11,15)$$

Ans

	$X'Y'$	$X'Y$	$XY$	$XY'$
$Z'W'$	1	1		1
$Z'W$	1	1		1
$ZW$		1	1	1
$ZW'$		1		

OR

	$Z'W'$	$Z'W$	$ZW$	$ZW'$
$X'Y'$	1	1		
$X'Y$	1	1	1	1
$XY$			1	
$XY'$	1	1	1	

Simplified Expression:  $Y'Z' + X'Y + XZW$

*(1/2 Mark for drawing K-Map with correct variable names)*

*(1/2 Mark for placing all 1s at correct positions in K-Map)*

( $\frac{1}{2}$  Mark for each of three grouping  $Y'Z'$ ,  $X'Y$ ,  $XZW$ )

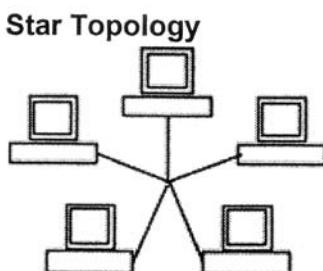
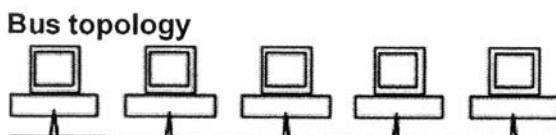
( $\frac{1}{2}$  Mark for writing final expression in reduced/minimal/non redundant form as  $Y'Z' + X'Y + XZW$  )

**Note:** Deduct  $\frac{1}{2}$  mark if wrong variable names are used

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

1

Ans



OR any valid illustration of Bus and Star Topology.

( $\frac{1}{2}$  Mark for drawing each correct layout)

- (b) What kind of data gets stored in cookies and how is it useful?

1

Ans When a Website with cookie capabilities is visited , its server sends certain information about the browser, which is stored in the hard drive as a text file. It's a way for the server to remember things about the visited sites.

(1 Mark for correct kind of data stored)

- (c) Differentiate between packet switching over message switching?

1

Ans **Packet Switching**-follows store and forward principle for fixed packets. Fixes an upper limit for packet size.

**Message Switching**-follows store and forward principle for complete message. No limit on block size.

*(1 Mark for any valid differentiation)*

*OR*

*(1 Mark for correct definition of Packet Switching only)*

- (d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication? 1

Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber

Ans (i) *Wired - Optical Fiber*

(ii) *Wireless - Infrared OR Microwave*

*(½ Mark each for Wired and Wireless medium of communication)*

- (e) What is Trojan Horse? 1

Ans A Trojan Horse is a code hidden in a program, that looks safe but has hidden side effects typically causing loss or theft of data, and possible system harm.

*(1 Mark for writing correct meaning of Trojan)*

- (f) Out of the following, which all comes under cyber crime? 1

(i) Stealing away a brand new hard disk from a showroom.

(ii) Getting in someone's social networking account without his consent and posting on his behalf.

(iii) Secretly copying data from server of an organization and selling it to the other organization.

(iv) Looking at online activities of a friends blog.

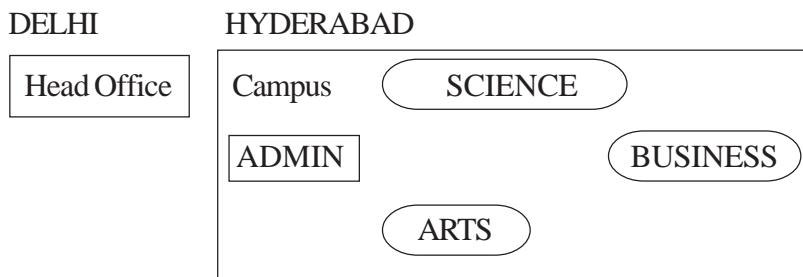
Ans (ii) & (iii)

*(½ Mark for choosing each of the correct options)*

*Note:*

- *No marks to be given, if all options are there in the answer*
- *½ Mark to be deducted, if one extra option is given along with the correct options*

- (g) Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and ARTS. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various buildings :

ADMIN to SCIENCE	65m
ADMIN to BUSINESS	100m
ADMIN to ARTS	60m
SCIENCE to BUSINESS	75m
SCIENCE to ARTS	60m
BUSINESS to ARTS	50m
DELHI Head Office to HYDERABAD Campus	1600Km

Number of computers installed at various buildings are as follows:

ADMIN	100
SCIENCE	85
BUSINESS	40
ARTS	12
DELHI Head Office	20

- (i) Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum number of computers. Justify your answer.

1

Ans **ADMIN** (due to maximum number of computers)

**OR**

**ARTS** (due to shorter distance from the other buildings)

*(1 Mark for mentioning Correct building name with reason)*

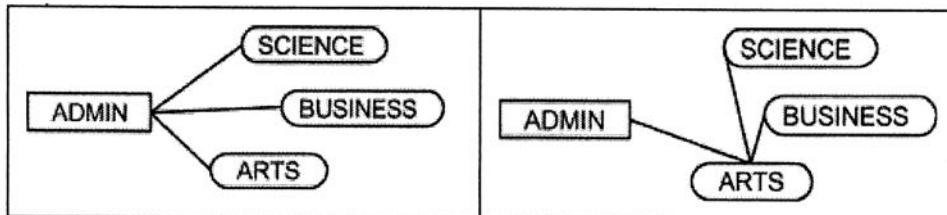
**OR**

*(1/2 Mark to be deducted for not giving reason)*

- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the HYDERABAD campus for connecting the computers.

1

Ans Anyone of the following



*(1 Mark for drawing correct layout)*

- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus?

1

Ans Firewall OR Router

*(1 Mark for correct Answer)*

- (iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of HYDERABAD campus and DELHI Head Office?

1

- (i) E-mail
- (ii) Text Chat
- (iii) Video Conferencing
- (iv) Cable TV

Ans Video Conferencing

*(1 Mark for correct Option / Answer)*

**Sample Question Paper**  
**Class: XII Session: 2021-22**  
**Computer Science (Code 083)**  
**(Theory: Term-1)**

**Maximum Marks: 35**

**Time Allowed: 90 Minutes**

**General Instructions:**

- The question paper is divided into 3 Sections - A, B and C.
- Section A, consist of 25 Questions (1-25). Attempt any 20 questions.
- Section B, consist of 24 Questions (26-49). Attempt any 20 questions.
- Section C, consist of 6 case study based Questions (50-55). Attempt any 5 questions.
- All questions carry equal marks.

Q.N.	Section-A
	<b>This section consists of 25 Questions (1 to 25). Attempt any 20 questions from this section. Choose the best possible option.</b>
1	Find the invalid identifier from the following a. none b. address c. Name d. <b>pass</b>
2	Consider a declaration L = (1, 'Python', '3.14'). Which of the following represents the data type of L? a. list <b>b. tuple</b> c. dictionary d. string
3	Given a Tuple tup1= (10, 20, 30, 40, 50, 60, 70, 80, 90). What will be the output of print (tup1 [3:7:2])? a. (40,50,60,70,80) b. (40,50,60,70) c. [40,60] <b>d. (40,60)</b>
4	Which of the following option is not correct? a. if we try to read a text file that does not exist, an error occurs. <b>b. if we try to read a text file that does not exist, the file gets created.</b> c. if we try to write on a text file that does not exist, no error occurs. d. if we try to write on a text file that does not exist, the file gets Created.
5	Which of the following options can be used to read the first line of a text file Myfile.txt? a. myfile = open('Myfile.txt'); myfile.read() b. myfile = open('Myfile.txt','r'); myfile.read(n) <b>c. myfile = open('Myfile.txt'); myfile.readline()</b> d. myfile = open('Myfile.txt'); myfile.readlines()

6	<p>Assume that the position of the file pointer is at the beginning of 3rd line in a text file. Which of the following option can be used to read all the remaining lines?</p> <ol style="list-style-type: none"> <li><b>myfile.read()</b></li> <li>myfile.read(n)</li> <li>myfile.readline()</li> <li>myfile.readlines()</li> </ol>
7	<p>A text file student.txt is stored in the storage device. Identify the correct option out of the following options to open the file in read mode.</p> <ol style="list-style-type: none"> <li>myfile = open('student.txt', 'rb')</li> <li>myfile = open('student.txt', 'w')</li> <li>myfile = open('student.txt', 'r')</li> <li>myfile = open('student.txt')</li> </ol> <ol style="list-style-type: none"> <li>only i</li> <li>both i and iv</li> <li><b>both iii and iv</b></li> <li>both i and iii</li> </ol>
8	<p>The return type of the input() function is</p> <ol style="list-style-type: none"> <li><b>string</b></li> <li>integer</li> <li>list</li> <li>tuple</li> </ol>
9	<p>Which of the following operator cannot be used with string data type?</p> <ol style="list-style-type: none"> <li>+</li> <li>in</li> <li>*</li> <li><b>/</b></li> </ol>
10	<p>Consider a tuple tup1 = (10, 15, 25, and 30). Identify the statement that will result in an error.</p> <ol style="list-style-type: none"> <li>print(tup1[2])</li> <li><b>tup1[2] = 20</b></li> <li>print(min(tup1))</li> <li>print(len(tup1))</li> </ol>
11	<p>Which of the following statement is incorrect in the context of binary files?</p> <ol style="list-style-type: none"> <li>Information is stored in the same format in which the information is held in memory.</li> <li>No character translation takes place</li> <li><b>Every line ends with a new line character</b></li> <li>pickle module is used for reading and writing</li> </ol>
12	<p>What is the significance of the tell() method?</p> <ol style="list-style-type: none"> <li>tells the path of file</li> <li><b>tells the current position of the file pointer within the file</b></li> <li>tells the end position within the file</li> <li>checks the existence of a file at the desired location</li> </ol>

13	<p>Which of the following statement is true?</p> <ul style="list-style-type: none"> <li>a. pickling creates an object from a sequence of bytes</li> <li><b>b. pickling is used for object serialization</b></li> <li>c. pickling is used for object deserialization</li> <li>d. pickling is used to manage all types of files in Python</li> </ul>
14	<p>Syntax of seek function in Python is myfile.seek(offset, reference_point) where myfile is the file object. What is the default value of reference_point?</p> <ul style="list-style-type: none"> <li><b>a. 0</b></li> <li>b. 1</li> <li>c. 2</li> <li>d. 3</li> </ul>
15	<p>Which of the following components are part of a function header in Python?</p> <ul style="list-style-type: none"> <li>a. Function Name</li> <li>b. Return Statement</li> <li>c. Parameter List</li> <li><b>d. Both a and c</b></li> </ul>
16	<p>Which of the following function header is correct?</p> <ul style="list-style-type: none"> <li>a. def cal_si(p=100, r, t=2)</li> <li>b. def cal_si(p=100, r=8, t)</li> <li>c. def cal_si(p, r=8, t)</li> <li><b>d. def cal_si(p, r=8, t=2)</b></li> </ul>
17	<p>Which of the following is the correct way to call a function?</p> <ul style="list-style-type: none"> <li><b>a. my_func()</b></li> <li>b. def my_func()</li> <li>c. return my_func</li> <li>d. call my_func()</li> </ul>
18	<p>Which of the following character acts as default delimiter in a csv file?</p> <ul style="list-style-type: none"> <li>a. (colon) :</li> <li>b. (hyphen) -</li> <li><b>c. (comma) ,</b></li> <li>d. (vertical line)  </li> </ul>
19	<p>Syntax for opening Student.csv file in write mode is  <code>myfile = open("Student.csv", "w", newline="")</code>.</p> <p>What is the importance of <code>newline=""</code>?</p> <ul style="list-style-type: none"> <li>a. A newline gets added to the file</li> <li>b. Empty string gets appended to the first line.</li> <li>c. Empty string gets appended to all lines.</li> <li><b>d. EOL translation is suppressed</b></li> </ul>
20	<p>What is the correct expansion of CSV files?</p> <ul style="list-style-type: none"> <li>a. Comma Separable Values</li> <li><b>b. Comma Separated Values</b></li> <li>c. Comma Split Values</li> <li>d. Comma Separation Values</li> </ul>

21	Which of the following is not a function / method of csv module in Python? a. read() b. reader() c. writer() d. writerow()
22	Which one of the following is the default extension of a Python file? a. .exe b. .p++ c. .py d. .p
23	Which of the following symbol is used in Python for single line comment? a. / b. /* c. // d. #
24	Which of the following statement opens a binary file record.bin in write mode and writes data from a list lst1 = [1,2,3,4] on the binary file? a. with open('record.bin','wb') as myfile: pickle.dump(lst1,myfile)  b. with open('record.bin','wb') as myfile: pickle.dump(myfile,lst1)  c. with open('record.bin','wb+') as myfile: pickle.dump(myfile,lst1)  d. with open('record.bin','ab') as myfile: pickle.dump(myfile,lst1)
25	Which of these about a dictionary is false? a) The values of a dictionary can be accessed using keys b) The keys of a dictionary can be accessed using values c) Dictionaries aren't ordered d) Dictionaries are mutable
	<b>Section-B</b>
	<b>This section consists of 24 Questions (26 to 49). Attempt any 20 questions.</b>
26	What is the output of following code: <pre>T= (100)       print (T*2)</pre> a. Syntax error b. (200,) c. 200 d. (100,100)

27	<p>Suppose content of 'Myfile.txt' is:</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> Twinkle twinkle little star  How I wonder what you are  Up above the world so high  Like a diamond in the sky </div> <p>What will be the output of the following code?</p> <pre>myfile = open("Myfile.txt") data = myfile.readlines() print(len(data)) myfile.close()</pre> <p>a. 3  <b>b. 4</b>  c. 5  d. 6</p>
28	<p>Identify the output of the following Python statements.</p> <pre>x = [[10.0, 11.0, 12.0], [13.0, 14.0, 15.0]] y = x[1][2] print(y)</pre> <p>a. 12.0  b. 13.0  c. 14.0  <b>d. 15.0</b></p>
29	<p>Identify the output of the following Python statements.</p> <pre>x = 2 while x &lt; 9:     print(x, end=' ')     x = x + 1</pre> <p>a. 12345678  b. 123456789  <b>c. 2345678</b>  d. 23456789</p>
30	<p>Identify the output of the following Python statements.</p> <pre>b = 1 for a in range(1, 10, 2):     b += a + 2 print(b)</pre> <p>a. 31  b. 33  <b>c. 36</b>  d. 39</p>

31	<p>Identify the output of the following Python statements.</p> <pre>lst1 = [10, 15, 20, 25, 30] lst1.insert( 3, 4) lst1.insert( 2, 3) print (lst1[-5])</pre> <p>a. 2  <b>b. 3</b>  c. 4  d. 20</p>																		
32	<p>Raghav is trying to write a tuple <code>tup1 = (1,2,3,4,5)</code> on a binary file <b>test.bin</b>. Consider the following code written by him.</p> <pre>import pickle tup1 = (1,2,3,4,5) myfile = open("test.bin",'wb') pickle._____ #Statement 1 myfile.close()</pre> <p>Identify the missing code in Statement 1.</p> <p>a. <code>dump(myfile,tup1)</code>  <b>b. <code>dump(tup1, myfile)</code></b>  c. <code>write(tup1,myfile)</code>  d. <code>load(myfile,tup1)</code></p>																		
33	<p>A binary file <code>employee.dat</code> has following data</p> <table border="1" data-bbox="626 1022 1099 1284"> <thead> <tr> <th>Empno</th> <th>empname</th> <th>Salary</th> </tr> </thead> <tbody> <tr> <td>101</td> <td>Anuj</td> <td>50000</td> </tr> <tr> <td>102</td> <td>Arijita</td> <td>40000</td> </tr> <tr> <td>103</td> <td>Hanika</td> <td>30000</td> </tr> <tr> <td>104</td> <td>Firoz</td> <td>60000</td> </tr> <tr> <td>105</td> <td>Vijaylakshmi</td> <td>40000</td> </tr> </tbody> </table> <pre>def display(en):     f=open("employee.dat","rb")     totSum=0     try:         while True:             R=pickle.load(f)             if R[0]==en:                 _____ #Line1                 totSum=totSum+R[2]     except:         f.close()     print(totSum)</pre> <p>When the above mentioned function, <code>display (103)</code> is executed, the output displayed is 190000.</p> <p>Write appropriate jump statement from the following to obtain the above output.</p>	Empno	empname	Salary	101	Anuj	50000	102	Arijita	40000	103	Hanika	30000	104	Firoz	60000	105	Vijaylakshmi	40000
Empno	empname	Salary																	
101	Anuj	50000																	
102	Arijita	40000																	
103	Hanika	30000																	
104	Firoz	60000																	
105	Vijaylakshmi	40000																	

	<p>a. jump      b. break      c. continue      d. return</p>
34	<p>What will be the output of the following Python code?</p> <pre>def add (num1, num2) :     sum = num1 + num2 sum = add(20,30) print(sum)</pre> <p>a. 50      b. 0      c. Null      d. None</p>
35	<p>Evaluate the following expression and identify the correct answer.</p> $16 - (4 + 2) * 5 + 2^{**}3 * 4$ <p>a. 54      b. 46      c. 18      d. 32</p>
36	<p>What will be the output of the following code?</p> <pre>def my_func(var1=100, var2=200):     var1+=10     var2 = var2 - 10     return var1+var2 print(my_func(50),my_func())</pre> <p>a. 100 200      b. 150 300      c. 250 75      d. 250 300</p>
37	<p>What will be the output of the following code?</p> <pre>value = 50 def display(N):     global value     value = 25     if N%7==0:         value = value + N     else:         value = value - N     print(value, end="#") display(20) print(value)</pre> <p>a. 50#50      b. 50#5      c. 50#30      d. 5#50#</p>

38	<p>What will be the output of the following code?</p> <pre>import random List=["Delhi","Mumbai","Chennai","Kolkata"] for y in range(4):     x = random.randint(1,3)     print(List[x],end="#")</pre> <p>a. Delhi#Mumbai#Chennai#Kolkata#  b. Mumbai#Chennai#Kolkata#Mumbai#  c. Mumbai# Mumbai #Mumbai # Delhi#  d. Mumbai# Mumbai #Chennai # Mumbai</p>
39	<p>What is the output of the following code snippet?</p> <pre>def ChangeVal(M,N):     for i in range(N):         if M[i]%5 == 0:             M[i]//=5         if M[i]%3 == 0:             M[i]//=3 L = [25,8,75,12] ChangeVal(L,4) for i in L:     print(i,end="#")</pre> <p>a) 5#8#15#4#  b) 5#8#5#4#  c) 5#8#15#14#  d) 5#18#15#4#</p>
40	<p>Suppose content of 'Myfile.txt' is</p> <div style="border: 1px solid black; padding: 10px;"> <p>Humpty Dumpty sat on a wall  Humpty Dumpty had a great fall  All the king's horses and all the king's men  Couldn't put Humpty together again</p> </div> <p>What will be the output of the following code?</p> <pre>myfile = open("Myfile.txt") record = myfile.read().split() print(len(record)) myfile.close()</pre> <p>a. 24  b. 25  c. 26  d. 27</p>
41	<p>Find the output of the following code:</p> <pre>Name="PythoN3.1" R="" for x in range(len(Name)):     if Name[x].isupper():         R=R+Name[x].lower()</pre>

```

        elif Name[x].islower():
            R=R+Name[x].upper()
        elif Name[x].isdigit():
            R=R+Name[x-1]
        else:
            R=R+"#"
    print(R)

```

- a. pYTHON##@
- b. pYTHON#@**
- c. pYTHON#@
- d. pYTHON@#

42 Suppose content of 'Myfile.txt' is

Honesty is the best policy.

What will be the output of the following code?

```

myfile = open("Myfile.txt")
x = myfile.read()
print(len(x))
myfile.close()

```

- a. 5
- b. 25
- c. 26
- d. 27**

43 Suppose content of 'Myfile.txt' is

Culture is the widening of the mind and of the spirit.

What will be the output of the following code?

```

myfile = open("Myfile.txt")
x = myfile.read()
y = x.count('the')
print(y)
myfile.close()

```

- a. 2
- b. 3**
- c. 4
- d. 5

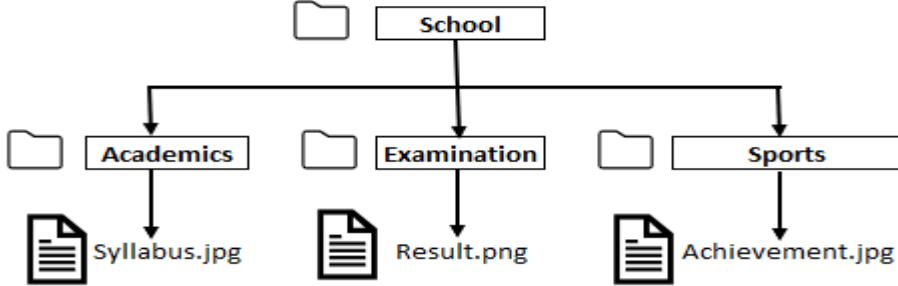
44 What will be the output of the following code?

```

x = 3
def myfunc():
    global x
    x+=2
    print(x, end=' ')
print(x, end=' ')
myfunc()
print(x, end=' ')

```

	<p>a. 3 3 3 b. 3 4 5 c. 3 3 5 <b>d. 3 5 5</b></p>
45	<p>Suppose content of 'Myfile.txt' is</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Ek Bharat Shreshtha Bharat</p> </div> <p>What will be the output of the following code?</p> <pre>myfile = open("Myfile.txt") vlist = list("aeiouAEIOU") vc=0 x = myfile.read() for y in x:     if(y in vlist):         vc+=1 print(vc) myfile.close()</pre> <p>a. 6 <b>b. 7</b> c. 8 d. 9</p>
46	<p>Suppose content of 'Myfile.txt' is</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Twinkle twinkle little star How I wonder what you are Up above the world so high Like a diamond in the sky Twinkle twinkle little star</p> </div> <p>What will be the output of the following code?</p> <pre>myfile = open("Myfile.txt") line_count = 0 data = myfile.readlines() for line in data:     if line[0] == 'T':         line_count += 1 print(line_count) myfile.close()</pre> <p><b>a. 2</b> b. 3 c. 4 d. 5</p>

47	<p>Consider the following directory structure.</p>  <pre> graph TD     School["School"] --&gt; Academics["Academics"]     School --&gt; Examination["Examination"]     School --&gt; Sports["Sports"]     Academics --&gt; Syllabus["Syllabus.jpg"]     Examination --&gt; Result["Result.png"]     Sports --&gt; Achievement["Achievement.jpg"]   </pre> <p>Suppose root directory (School) and present working directory are the same. What will be the absolute path of the file Syllabus.jpg?</p> <ul style="list-style-type: none"> <li>a. School/syllabus.jpg</li> <li><b>b. School/Academics/syllabus.jpg</b></li> <li>c. School/Academics/..syllabus.jpg</li> <li>d. School/Examination/syllabus.jpg</li> </ul>
48	<p>Assume the content of text file, 'student.txt' is:</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Arjun Kumar Ismail Khan Joseph B Hanika Kiran</p> </div> <p>What will be the data type of data_rec?</p> <pre> myfile = open("Myfile.txt") data_rec = myfile.readlines() myfile.close()   </pre> <ul style="list-style-type: none"> <li>a. string</li> <li><b>b. list</b></li> <li>c. tuple</li> <li>d. dictionary</li> </ul>
49	<p>What will be the output of the following code?</p> <pre> tup1 = (1,2,[1,2],3) tup1[2][1]=3.14 print(tup1)   </pre> <ul style="list-style-type: none"> <li>a. (1,2,[3.14,2],3)</li> <li><b>b. (1,2,[1,3.14],3)</b></li> <li>c. (1,2,[1,2],3.14)</li> <li>d. Error Message</li> </ul>

	<b>Section-C</b> <b>Case Study based Questions</b>
	<b>This section consists of 6 Questions (50 -55) Attempt any 5 questions.</b>
	<p>Rohit, a student of class 12, is learning CSV File Module in Python. During examination, he has been assigned an incomplete python code (shown below) to create a CSV File 'Student.csv' (content shown below). Help him in completing the code which creates the desired CSV File.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p><b>CSV File</b></p> <pre>1,AKSHAY,XII,A 2,ABHISHEK,XII,A 3,ARVIND,XII,A 4,RAVI,XII,A 5,ASHISH,XII,A</pre> </div> <p><b>Incomplete Code</b></p> <pre>import _____ #Statement-1 fh = open(_____, _____, newline="") #Statement-2 stuwriter = csv._____ #Statement-3 data = [] header = ['ROLL_NO', 'NAME', 'CLASS', 'SECTION'] data.append(header) for i in range(5):     roll_no = int(input("Enter Roll Number : "))     name = input("Enter Name : ")     Class = input("Enter Class : ")     section = input("Enter Section : ")     rec = [ _____ ] #Statement-4     data.append(_____) #Statement-5 stuwriter. _____ (data) #Statement-6 fh.close()</pre>
50	<p>Identify the suitable code for blank space in the line marked as Statement-1.</p> <ul style="list-style-type: none"> <li>a) csv file</li> <li>b) CSV</li> <li>c) <b>csv</b></li> <li>d) cvs</li> </ul>
51	<p>Identify the missing code for blank space in line marked as Statement-2.</p> <ul style="list-style-type: none"> <li>a) "Student.csv","wb"</li> <li>b) <b>"Student.csv","w"</b></li> <li>c) "Student.csv","r"</li> <li>d) "Student.cvs","r"</li> </ul>
52	<p>Choose the function name (with argument) that should be used in the blank space of line marked as Statement-3.</p> <ul style="list-style-type: none"> <li>a) reader(fh)</li> <li>b) reader(MyFile)</li> <li>c) <b>writer(fh)</b></li> <li>d) writer(MyFile)</li> </ul>

53	<p>Identify the suitable code for blank space in line marked as Statement-4.</p> <ul style="list-style-type: none"> <li>a) 'ROLL_NO', 'NAME', 'CLASS', 'SECTION'</li> <li>b) ROLL_NO, NAME, CLASS, SECTION</li> <li>c) 'roll_no','name','Class','section'</li> <li>d) roll_no,name,Class,section</li> </ul>
54	<p>Identify the suitable code for blank space in the line marked as Statement-5.</p> <ul style="list-style-type: none"> <li>a) data</li> <li>b) record</li> <li>c) rec</li> <li>d) insert</li> </ul>
55	<p>Choose the function name that should be used in the blank space of line marked as Statement-6 to create the desired CSV File?</p> <ul style="list-style-type: none"> <li>a) dump()</li> <li>b) load()</li> <li>c) writerows()</li> <li>d) writerow()</li> </ul>

## **Marking Scheme**

**Class: XII Session: 2021-22**

**Computer Science (Code 083)**

1	d. pass
2	b. tuple
3	d. (40,60)
4	b. if we try to read a text file that does not exist, the file gets created.
5	c. myfile = open('Myfile.txt'); myfile.readline()
6	d. myfile.readlines()
7	c. both iii and iv
8	a. string
9	d. /
10	b. tup1[2] = 20
11	c. Every line ends with a new line character
12	b. tells the current position of the file pointer within the file
13	b. pickling is used for object serialization
14	a. 0
15	d. Both a and c
16	d. def cal_si(p, r=8, t=2)
17	a. my_func()
18	c. ,
19	d. EOL Translation is suppressed
20	b. Comma Separated Values
21	a. read()
22	c. .py
23	d. #
24	a. with open('record.bin','wb') as myfile: pickle.dump(lst1,myfile)
25	b. The keys of a dictionary can be accessed using values
26	c. 200
27	b. 4
28	d. 15.0
29	c. 2345678
30	c. 36
31	b. 3
32	b. dump(tup1, myfile)
33	c. continue
34	d. None
35	c. 18
36	d. 250 300
37	b. 50#5
38	b. Mumbai#Chennai#Kolkata#Mumbai#
39	b. 5#8#5#4#
40	c. 26
41	b. pYTHON#@
42	d. 27

43	b. 3
44	d. 3 5 5
45	b. 7
46	a. 2
47	b. School/Academics/syllabus.jpg
48	b. list
49	b. (1,2,[1,3,14],3)
50	c. csv
51	b. "Student.csv","w"
52	c. writer(fh)
53	d. roll_no,name,Class,section
54	c. rec
55	c. writerows()

**Class: XII Session: 2020-21**  
**Computer Science (083)**  
**Sample Question Paper (Theory)**

**Maximum Marks: 70**

**Time Allowed: 3 hours**

**General Instructions:**

1. This question paper contains two parts A and B. Each part is compulsory.
2. Both Part A and Part B have choices.
3. Part-A has 2 sections:
  - a. Section – I is short answer questions, to be answered in one word or one line.
  - b. Section – II has two case studies questions. Each case study has 4 case-based sub-parts. An examinee is to attempt any 4 out of the 5 subparts.
4. Part - B is Descriptive Paper.
5. Part- B has three sections
  - a. Section-I is short answer questions of 2 marks each in which two question have internal options.
  - b. Section-II is long answer questions of 3 marks each in which two questions have internal options.
  - c. Section-III is very long answer questions of 5 marks each in which one question has internal option.
6. All programming questions are to be answered using Python Language only

<b>Question No.</b>	<b>Part-A</b>	<b>Marks allocated</b>
	<p style="text-align: center;"><b>Section-I</b></p> <p><b>Select the most appropriate option out of the options given for each question. Attempt any 15 questions from question no 1 to 21.</b></p>	
1	Find the invalid identifier from the following a) MyName    b) True    c) 2ndName    d) My_Name	1
2	Given the lists L=[1,3,6,82,5,7,11,92] , write the output of print(L[2:5])	1
3	Write the full form of CSV.	1
4	Identify the valid arithmetic operator in Python from the following. a) ?        b) <        c) **        d) and	1

5	Suppose a tuple T is declared as T = (10, 12, 43, 39), which of the following is incorrect? a) print(T[1]) b) T[2] = -29 c) print(max(T)) d) print(len(T))	1
6	Write a statement in Python to declare a dictionary whose keys are 1, 2, 3 and values are Monday, Tuesday and Wednesday respectively.	1
7	A tuple is declared as $T = (2,5,6,9,8)$ What will be the value of sum(T)?	1
8	Name the built-in mathematical function / method that is used to return an absolute value of a number.	1
9	Name the protocol that is used to send emails.	1
10	Your friend Ranjana complaints that somebody has created a fake profile on Facebook and defaming her character with abusive comments and pictures. Identify the type of cybercrime for these situations.	1
11	In SQL, name the clause that is used to display the tuples in ascending order of an attribute.	1
12	In SQL, what is the use of IS NULL operator?	1
13	Write any one aggregate function used in SQL.	1
14	Which of the following is a DDL command? a) SELECT b) ALTER c) INSERT d) UPDATE	1
15	Name The transmission media best suitable for connecting to hilly areas.	1
16	Identify the valid declaration of L: $L = ['Mon', '23', 'hello', '60.5']$	1

	a. dictionary    b. string    c. tuple    d. list	
17	If the following code is executed, what will be the output of the following code?  name="ComputerSciencewithPython" print(name[3:10])	1
18	In SQL, write the query to display the list of tables stored in a database.	1
19	Write the expanded form of Wi-Fi.	1
20	Which of the following types of table constraints will prevent the entry of duplicate rows?  a) Unique b) Distinct c) Primary Key d) NULL	1
21	Rearrange the following terms in increasing order of data transfer rates.  Gbps, Mbps, Tbps, Kbps, bps	1
	<b>Section-II</b>  <b>Both the Case study based questions are compulsory. Attempt any 4 sub parts from each question. Each question carries 1 mark</b>	
22	A departmental store MyStore is considering to maintain their inventory using SQL to store the data. As a database administer, Abhay has decided that :  <ul style="list-style-type: none"> <li>• Name of the database - mystore</li> <li>• Name of the table - STORE</li> <li>• The attributes of STORE are as follows:  ItemNo - numeric ItemName – character of size 20 Scode - numeric Quantity – numeric</li> </ul>	

	<p>Table : STORE</p> <table border="1"> <thead> <tr> <th>ItemNo</th><th>ItemName</th><th>Scode</th><th>Quantity</th></tr> </thead> <tbody> <tr> <td>2005</td><td>Sharpener Classic</td><td>23</td><td>60</td></tr> <tr> <td>2003</td><td>Ball Pen 0.25</td><td>22</td><td>50</td></tr> <tr> <td>2002</td><td>Get Pen Premium</td><td>21</td><td>150</td></tr> <tr> <td>2006</td><td>Get Pen Classic</td><td>21</td><td>250</td></tr> <tr> <td>2001</td><td>Eraser Small</td><td>22</td><td>220</td></tr> <tr> <td>2004</td><td>Eraser Big</td><td>22</td><td>110</td></tr> <tr> <td>2009</td><td>Ball Pen 0.5</td><td>21</td><td>180</td></tr> </tbody> </table>	ItemNo	ItemName	Scode	Quantity	2005	Sharpener Classic	23	60	2003	Ball Pen 0.25	22	50	2002	Get Pen Premium	21	150	2006	Get Pen Classic	21	250	2001	Eraser Small	22	220	2004	Eraser Big	22	110	2009	Ball Pen 0.5	21	180	
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2009	Ball Pen 0.5	21	180																															
	(a) Identify the attribute best suitable to be declared as a primary key,	1																																
	(b) Write the degree and cardinality of the table STORE.	1																																
	(c) Insert the following data into the attributes ItemNo, ItemName and SCode respectively in the given table STORE. ItemNo = 2010, ItemName = "Note Book" and Scode = 25	1																																
	(d) Abhay want to remove the table STORE from the database MyStore. Which command will he use from the following: a) DELETE FROM store; b) DROP TABLE store; c) DROP DATABASE mystore; d) DELETE store FROM mystore;	1																																
	(e) Now Abhay wants to display the structure of the table STORE, i.e, name of the attributes and their respective data types that he has used in the table. Write the query to display the same.	1																																
23	<p>Ranjan Kumar of class 12 is writing a program to create a CSV file "user.csv" which will contain user name and password for some entries. He has written the following code. As a programmer, help him to successfully execute the given task.</p> <pre>import _____ # Line 1  def addCsvFile(UserName,PassWord):      # to write / add data into the CSV file     f=open(' user.csv','_____')          # Line 2</pre>																																	

```

newFileWriter = csv.writer(f)
newFileWriter.writerow([UserName,PassWord])
f.close()

#csv file reading code
def readCsvFile():           # to read data from CSV file
    with open(' user.csv','r') as newFile:
        newFileReader = csv._____ (newFile)          # Line 3
        for row in newFileReader:
            print (row[0],row[1])
        newFile._____                                # Line 4

addCsvFile("Arjun","123@456")
addCsvFile("Arunima","aru@nima")
addCsvFile("Frieda","myname@FRD")
readCsvFile()                      #Line 5

```

- |  |   |
|--|---|
| (a) Name the module he should import in Line 1.                          | 1 |
| (b) In which mode, Ranjan should open the file to add data into the file | 1 |
| (c) Fill in the blank in Line 3 to read the data from a csv file.        | 1 |
| (d) Fill in the blank in Line 4 to close the file.                       | 1 |
| (e) Write the output he will obtain while executing Line 5.              | 1 |

### Part – B

#### Section-I

24	Evaluate the following expressions: a) $6 * 3 + 4^{**2} // 5 - 8$ b) $10 > 5$ and $7 > 12$ or not $18 > 3$	2
25	Differentiate between Viruses and Worms in context of networking and data communication threats.  <b>OR</b> Differentiate between Web server and web browser. Write any two popular web browsers.	2
26	Expand the following terms: a. SMTP    b. XML    c. LAN    d. IPR	2

27	<p>Differentiate between actual parameter(s) and a formal parameter(s) with a suitable example for each.</p> <p style="text-align: center;"><b>OR</b></p> <p>Explain the use of global key word used in a function with the help of a suitable example.</p>	2
28	<p>Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code.</p> <pre> Value=30 for VAL in range(0,Value)     If val%4==0:         print (VAL*4)     Elseif val%5==0:         print (VAL+3)     else         print(VAL+10) </pre>	2
29	<p>What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables Lower and Upper.</p> <pre> import random AR=[20,30,40,50,60,70]; Lower =random.randint(1,3) Upper =random.randint(2,4) for K in range(Lower, Upper +1):     print (AR[K],end="#") </pre> <p>(i) 10#40#70#               (ii) 30#40#50#               (iii) 50#60#70#               (iv) 40#50#70#</p>	2
30	<p>What do you understand by Candidate Keys in a table? Give a suitable example of Candidate Keys from a table containing some meaningful data.</p>	2

31	Differentiate between <i>fetchone()</i> and <i>fetchall()</i> methods with suitable examples for each.	2
32	Write the full forms of DDL and DML. Write any two commands of DML in SQL.	2
33	<p>Find and write the output of the following Python code:</p> <pre> def Display(str):     m=""     for i in range(0,len(str)):         if(str[i].isupper()):             m=m+str[i].lower()         elif str[i].islower():             m=m+str[i].upper()         else:             if i%2==0:                 m=m+str[i-1]             else:                 m=m+"#"     print(m)  Display('Fun@Python3.0') </pre>	2
<b>Section- II</b>		
34	<p>Write a function LShift(<i>Arr,n</i>) in Python, which accepts a list <i>Arr</i> of numbers and <i>n</i> is a numeric value by which all elements of the list are shifted to left.</p> <p>Sample Input Data of the list  <i>Arr= [ 10,20,30,40,12,11], n=2</i></p> <p>Output  <i>Arr = [30,40,12,11,10,20]</i></p>	3
35	<p>Write a function in Python that counts the number of “Me” or “My” words present in a text file “STORY.TXT”.</p> <p>If the “STORY.TXT” contents are as follows:</p> <p>My first book  was Me and</p>	3

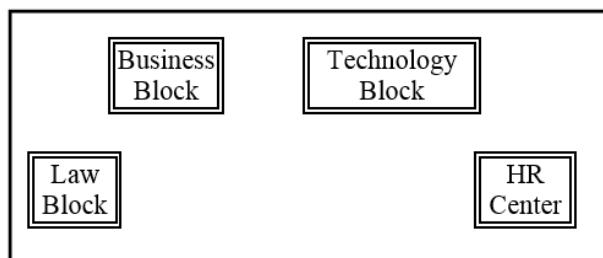
	<p>My Family. It gave me chance to be Known to the world.</p> <p>The output of the function should be: Count of Me/My in file: 4</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a function AMCount() in Python, which should read each character of a text file STORY.TXT, should count and display the occurrence of alphabets A and M (including small cases a and m too).</p> <p>Example: If the file content is as follows:</p> <p style="padding-left: 40px;">Updated information As simplified by official websites.</p> <p>The EUCount() function should display the output as: A or a:4 M or m :2</p>																																																																							
36	<p>Write the outputs of the SQL queries (i) to (iii) based on the relations Teacher and Posting given below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="7">Table : Teacher</th> </tr> <tr> <th>T_ID</th><th>Name</th><th>Age</th><th>Department</th><th>Date_of_join</th><th>Salary</th><th>Gender</th></tr> </thead> <tbody> <tr> <td>1</td><td>Jugal</td><td>34</td><td>Computer Sc</td><td>10/01/2017</td><td>12000</td><td>M</td></tr> <tr> <td>2</td><td>Sharmila</td><td>31</td><td>History</td><td>24/03/2008</td><td>20000</td><td>F</td></tr> <tr> <td>3</td><td>Sandeep</td><td>32</td><td>Mathematics</td><td>12/12/2016</td><td>30000</td><td>M</td></tr> <tr> <td>4</td><td>Sangeeta</td><td>35</td><td>History</td><td>01/07/2015</td><td>40000</td><td>F</td></tr> <tr> <td>5</td><td>Rakesh</td><td>42</td><td>Mathematics</td><td>05/09/2007</td><td>25000</td><td>M</td></tr> <tr> <td>6</td><td>Shyam</td><td>50</td><td>History</td><td>27/06/2008</td><td>30000</td><td>M</td></tr> <tr> <td>7</td><td>Shiv Om</td><td>44</td><td>Computer Sc</td><td>25/02/2017</td><td>21000</td><td>M</td></tr> <tr> <td>8</td><td>Shalakha</td><td>33</td><td>Mathematics</td><td>31/07/2018</td><td>20000</td><td>F</td></tr> </tbody> </table>	Table : Teacher							T_ID	Name	Age	Department	Date_of_join	Salary	Gender	1	Jugal	34	Computer Sc	10/01/2017	12000	M	2	Sharmila	31	History	24/03/2008	20000	F	3	Sandeep	32	Mathematics	12/12/2016	30000	M	4	Sangeeta	35	History	01/07/2015	40000	F	5	Rakesh	42	Mathematics	05/09/2007	25000	M	6	Shyam	50	History	27/06/2008	30000	M	7	Shiv Om	44	Computer Sc	25/02/2017	21000	M	8	Shalakha	33	Mathematics	31/07/2018	20000	F	3
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Table : Posting		
P_ID	Department	Place
1	History	Agra
2	Mathematics	Raipur
3	Computer Science	Delhi

- i.     SELECT Department, count(\*) FROM Teacher  
GROUP BY Department;
- ii.    SELECT Max(Date\_of\_Join),Min(Date\_of\_Join)  
FROM Teacher;
- iii.   SELECT Teacher.name,Teacher.Department,  
Posting.Place FROM Teachr, Posting WHERE  
Teacher.Department = Posting.Department AND  
Posting.Place="Delhi";

37	<p>Write a function in Python PUSH(Arr), where Arr is a list of numbers. From this list push all numbers divisible by 5 into a stack implemented by using a list. Display the stack if it has at least one element, otherwise display appropriate error message.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a function in Python POP(Arr), where Arr is a stack implemented by a list of numbers. The function returns the value deleted from the stack.</p>	3
----	---	---

### Section-III

38	<p>MyPace University is setting up its academic blocks at Naya Raipur and is planning to set up a network. The University has 3 academic blocks and one Human Resource Center as shown in the diagram below:</p>  <p>Center to Center distances between various blocks/center is as follows:</p>	5
----	--	---

Law Block to business Block	40m
Law block to Technology Block	80m
Law Block to HR center	105m
Business Block to technology Block	30m
Business Block to HR Center	35m
Technology block to HR center	15m

Number of computers in each of the blocks/Center is as follows:

Law Block	15
Technology Block	40
HR center	115
Business Block	25

- a) Suggest the most suitable place (i.e., Block/Center) to install the server of this University with a suitable reason.
- b) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.
- c) Which device will you suggest to be placed/installed in each of these blocks/centers to efficiently connect all the computers within these blocks/centers.
- d) Suggest the placement of a Repeater in the network with justification.
- e) The university is planning to connect its admission office in Delhi, which is more than 1250km from university. Which type of network out of LAN, MAN, or WAN will be formed?  
Justify your answer.

39

Write SQL commands for the following queries (i) to (v) based on the relations Teacher and Posting given below:

Table : Teacher

T_ID	Name	Age	Department	Date_of_join	Salary	Gender
1	Jugal	34	Computer Sc	10/01/2017	12000	M
2	Sharmila	31	History	24/03/2008	20000	F

5

3	Sandeep	32	Mathematics	12/12/2016	30000	M
4	Sangeeta	35	History	01/07/2015	40000	F
5	Rakesh	42	Mathematics	05/09/2007	25000	M
6	Shyam	50	History	27/06/2008	30000	M
7	Shiv Om	44	Computer Sc	25/02/2017	21000	M
8	Shalakha	33	Mathematics	31/07/2018	20000	F

Table : Posting

P_ID	Department	Place
1	History	Agra
2	Mathematics	Raipur
3	Computer Science	Delhi

- i. To show all information about the teacher of History department.
- ii. To list the names of female teachers who are in Mathematics department.
- iii. To list the names of all teachers with their date of joining in ascending order.
- iv. To display teacher's name, salary, age for male teachers only.
- v. To display name, bonus for each teacher where bonus is 10% of salary.

40

A binary file “Book.dat” has structure [BookNo, Book\_Name, Author, Price].

- i. Write a user defined function *CreateFile()* to input data for a record and add to Book.dat .
- ii. Write a function *CountRec(Author)* in Python which accepts the Author name as parameter and count and return number of books by the given Author are stored in the binary file “Book.dat”

**OR**

A binary file “STUDENT.DAT” has structure (admission\_number, Name, Percentage). Write a function *countrec()* in Python that would read contents of the file “STUDENT.DAT” and display the details of those students whose percentage is above 75. Also display number of students scoring above 75%

5

**Sample Question Paper - 2021**

**Computer Science – 083**

**MARKING SCHEME**

**Maximum Marks: 70**

**Time Allowed: 3 hours**

<b>Part – A</b>		
<b>Section - I</b>		
1	b) True	1
2	[6,82,5]	1
3	Comma Separated Value	1
4	c) **	1
5	b) T[2]=-29 (as tuple is immutable)	1
6	Day={1:'monday',2:'tuesday',3:'wednesday'}	1
7	30	
8	abs()	1
9	SMTP	1
10	Cyber Stalking	1
11	ORDER BY	1
12	To check if the column has null value / no value	1
13	SUM / AVG / COUNT / MAX / MIN	1
14	b) ALTER	1
15	Microwave / Radio wave	1
16	d. List	1
17	puterSc	1
18	SHOW TABLES	1
19	Wireless Fidelity	1
20	(c) Primary Key	1
21	Bps, Kbps, Mbps, Gbps, Tbps	1
<b>Part – A</b>		
<b>Section - II</b>		
22	(a) ItemNo	1
	(b) Degree = 4 Cardinality = 7	1
	(c) INSERT INTO store (ItemNo,ItemName,Scode) VALUES(2010, "Note Book",25);	1
	(d) DROP TABLE store;	1
	(e) Describe Store;	1
23	(a) Line 1 : csv	1
	(b) Line 2 : a	1
	(c) Line 3 : reader	1
	(d) Line 4 : close()	1

	(e) Line 5 : Arjun 123@456 Arunima aru@nima Frieda myname@FRD	1
	<b>Part – B</b>	
24	a) 13 b) False	2
25	<p>Viruses require an active host program or an already-infected and active operating system in order for viruses to run, cause damage and infect other executable files or documents</p> <p>Worms are stand-alone malicious programs that can self-replicate.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>Web Browser</b> : A web browser is a software application for accessing information on the World Wide Web. When a user requests a web page from a particular website, the web browser retrieves the necessary content from a web server and then displays the page on the user's device.</p> <p><b>Web Server</b> : A web server is a computer that runs websites. The basic objective of the web server is to store, process and deliver web pages to the users. This intercommunication is done using Hypertext Transfer Protocol (HTTP).</p> <p>Popular web browsers : Google Chrome, Mozilla Firefox, Internet Explorer etc</p>	2
26	<p>a. SMTP - Simple Mail Transfer Protocol</p> <p>b. XML - eXtensible Markup Language</p> <p>c. LAN – Local Area Network</p> <p>d. IPR – Intellectual Property Rights</p>	2
27	<p>The list of identifiers used in a function call is called actual parameter(s) whereas the list of parameters used in the function definition is called formal parameter(s).</p> <p>Actual parameter may be value / variable or expression.</p> <p>Formal parameter is an identifier.</p> <p>Example:</p> <pre>def area(side):          # line 1     return side*side;  print(area(5))          # line 2</pre> <p>In line 1, side is the formal parameter and in line 2, while invoking area() function, the value 5 is the actual parameter.</p>	2

	<p>A formal parameter, i.e. a parameter, is in the <i>function definition</i>. An actual parameter, i.e. an argument, is in a <i>function call</i>.</p> <p style="text-align: center;"><b>OR</b></p> <p>Use of global key word:</p> <p>In Python, global keyword allows the programmer to modify the variable outside the current scope. It is used to create a global variable and make changes to the variable in local context. A variable declared inside a function is by default local and a variable declared outside the function is global by default. The keyword global is written inside the function to use its global value. Outside the function, global keyword has no effect.</p> <p>Example</p> <pre>c = 10 # global variable def add():     global c     c = c + 2    # global value of c is incremented by 2     print("Inside add():", c)  add() c=15 print("In main:", c)</pre> <p>output:</p> <pre>Inside add() : 12 In main: 15</pre>	
28	<p><b>CORRECTED CODE:</b></p> <pre>Value=30 for VAL in range(0,Value):     if val%4==0:                      # Error 1         print (VAL*4)     elif val%5==0:                     # Error 2         print (VAL+3)     else:                             # Error 3         print(VAL+10)</pre>	2
29	<p><b>OUTPUT: (ii)</b></p> <p>Maximum value of Lower: 3</p> <p>Maximum value of Upper: 4</p>	2
30	<p>A table may have more than one such attribute/group of attributes that identifies a tuple uniquely, all such attribute(s) are known as Candidate Keys.</p>	2

	<p>Table:Item</p> <table border="1"> <thead> <tr> <th>INo</th><th>Item</th><th>Qty</th></tr> </thead> <tbody> <tr> <td>I01</td><td>Pen</td><td>500</td></tr> <tr> <td>I02</td><td>Pencil</td><td>700</td></tr> <tr> <td>I04</td><td>CD</td><td>500</td></tr> <tr> <td>I09</td><td></td><td>700</td></tr> <tr> <td>I05</td><td>Eraser</td><td>300</td></tr> <tr> <td>I03</td><td>Duster</td><td>200</td></tr> </tbody> </table> <p>In the above table Item, ItemNo can be a candidate key</p>	INo	Item	Qty	I01	Pen	500	I02	Pencil	700	I04	CD	500	I09		700	I05	Eraser	300	I03	Duster	200	
INo	Item	Qty																					
I01	Pen	500																					
I02	Pencil	700																					
I04	CD	500																					
I09		700																					
I05	Eraser	300																					
I03	Duster	200																					
31	<p>fetchall() fetches all the rows of a query result. An empty list is returned if there is no record to fetch the cursor.</p> <p>fetchone() method returns one row or a single record at a time. It will return None if no more rows / records are available.</p> <p>Any example.</p>	2																					
32	<p>DDL – Data Definition Language</p> <p>DML – Data Manipulation Language</p> <p>Any two out of INSERT, DELETE, UPDATE</p>	2																					
33	OUTPUT : fUNnpYTHON	2																					
34	<pre>def LShift(Arr,n):     L=len(Arr)     for x in range(0,n):         y=Arr[0]         for i in range(0,L-1):             Arr[i]=Arr[i+1]         Arr[L-1]=y     print(Arr)</pre> <p><b>Note : Using of any correct code giving the same result is also accepted.</b></p>	3																					
35	<pre>def displayMeMy():     num=0     f=open("story.txt","rt")     N=f.read()     M=N.split()     for x in M:         if x=="Me" or x=="My":             print(x)             num=num+1     f.close()     print("Count of Me/My in file:",num)</pre>	3																					

**OR**

```
def count_A_M():
    f=open("story.txt","r")
    A,M=0,0
    r=f.read()
    for x in r:
        if x[0]=="A" or x[0]=="a" :
            A=A+1
        elif x[0]=="M" or x[0]=="m":
            M=M+1
    f.close()
    print("A or a: ",A)
    print("M or m: ",M)
```

**Note : Using of any correct code giving the same result is also accepted.**

36	<p><b>OUTPUT:</b></p> <p>i.</p> <table border="1"><thead><tr><th>Department</th><th>Count(*)</th></tr></thead><tbody><tr><td>History</td><td>3</td></tr><tr><td>Computer Sc</td><td>2</td></tr><tr><td>Mathematics</td><td>3</td></tr></tbody></table> <p>ii. Max - 31/07/2018 or 2018-07-31      Min- 05/09/2007 or 2007-09-05</p> <p>iii.</p> <table border="1"><thead><tr><th>name</th><th>Department</th><th>Place</th></tr></thead><tbody><tr><td>Jugal</td><td>Computer Sc</td><td>Delhi</td></tr><tr><td>Shiv Om</td><td>Computer Sc</td><td>Delhi</td></tr></tbody></table>	Department	Count(*)	History	3	Computer Sc	2	Mathematics	3	name	Department	Place	Jugal	Computer Sc	Delhi	Shiv Om	Computer Sc	Delhi	3
Department	Count(*)																		
History	3																		
Computer Sc	2																		
Mathematics	3																		
name	Department	Place																	
Jugal	Computer Sc	Delhi																	
Shiv Om	Computer Sc	Delhi																	

37	<p><b>ANSWER: (Using of any correct code giving the same result is also accepted.)</b></p> <pre>def PUSH(Arr,value):     s=[]     for x in range(0,len(Arr)):         if Arr[x]%5==0:             s.append(Arr[x])     if len(s)==0:</pre>	3
----	--	---

```

print("Empty Stack")
else:
    print(s)

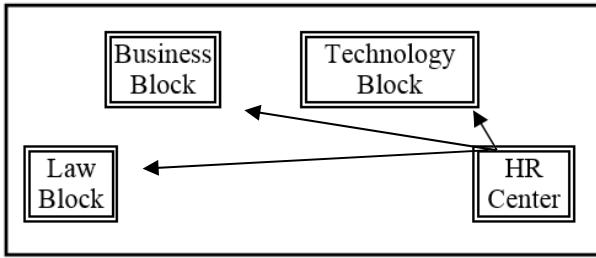
```

**OR**

```

def popStack(st) :
    # If stack is empty
    if len(st)==0:
        print("Underflow")
    else:
        L = len(st)
        val=st[L-1]
        print(val)
        st.pop(L-1)

```

38	<p>a. Most suitable place to install the server is HR center, as this center has maximum number of computers.</p> <p>b.</p>  <p>c. Switch</p> <p>d. Repeater may be placed when the distance between 2 buildings is more than 70 meter.</p> <p>e. WAN, as the given distance is more than the range of LAN and MAN.</p>	5
39	<p>i. SELECT * FROM teacher WHERE department= "History";</p> <p>ii. SELECT name FROM teacher WHERE department= "Mathematics" AND gender= "F";</p> <p>iii. SELECT name FROM teacher ORDER BY date_of_join;</p> <p>iv. SELECT name, salary, age FROM teacher WHERE gender='M';</p> <p>v. SELECT name, salary*0.1 AS Bonus FROM teacher;</p>	5

40	<b>ANSWER: (Using of any correct code giving the same result is also accepted.)</b>	5
	<pre> import pickle def createFile():     fobj=open("Book.dat","ab")     BookNo=int(input("Book Number : "))     Book_name=input("Name :")     Author = input("Author: ")     Price = int(input("Price : "))     rec=[BookNo,Book_Name,Author,Price]     pickle.dump(rec,fobj)     fobj.close()  def CountRec(Author):     fobj=open("Book.dat","rb")     num = 0     try:         while True:             rec=pickle.load(fobj)             if Author==rec[2]:                 num = num + 1     except:         fobj.close()     return num </pre> <p style="text-align: center;"><b>OR</b></p> <pre> import pickle def CountRec():     fobj=open("STUDENT.DAT","rb")     num = 0     try:         while True:             rec=pickle.load(fobj)             if rec[2] &gt; 75:                 print(rec[0],rec[1],rec[2],sep="\t")                 num = num + 1     except:         fobj.close()     return num </pre>	

**COMPUTER SCIENCE – NEW (083)**  
**SAMPLE QUESTION PAPER (2019-20)**  
**CLASS- XII**

**Max. Marks: 70**

**Time: 3 hrs**

**General Instructions:**

- All questions are compulsory.
- Question paper is divided into 4 sections A, B, C and D.
  - Section A : Unit-1
  - Section B : Unit-2
  - Section C: Unit-3
  - Section D: Unit-4

<b>SECTION-A</b>			
Q1.	(a)	Which of the following is valid arithmetic operator in Python: (i) //      (ii) ?    (iii) <    (iv) <b>and</b>	1
	(b)	Write the type of tokens from the following: (i) <b>if</b> (ii) <b>roll_no</b>	1
	(c)	Name the Python Library modules which need to be imported to invoke the following functions: (i) <b>sin()</b> (ii) <b>randint ()</b>	1
	(d)	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code. 30=To for K in range(0,To) IF k%4==0: print (K*4) Else: print (K+3)	2
	(e)	Find and write the output of the following python code: <pre>def fun(s):     k=len(s)     m=" "     for i in range(0,k):         if(s[i].isupper()):             m=m+s[i].lower()         elif s[i].isalpha():             m=m+s[i].upper()         else:             m=m+'bb'     print(m) fun('school2@com')</pre>	2
	(f)	Find and write the output of the following python code:	3

		<pre> def Change(P ,Q=30):     P=P+Q     Q=P-Q     print( P,"#",Q)     return (P)  R=150 S=100 R=Change(R,S) print(R,"#",S) S=Change(S) </pre>	
	(g)	<p>What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables FROM and TO.</p> <pre> import random AR=[20,30,40,50,60,70]; FROM=random.randint(1,3) TO=random.randint(2,4) for K in range(FROM,TO+1):     print (AR[K],end="#") </pre> <p>(i) 10#40#70# (ii) 30#40#50#  (iii) 50#60#70# (iv) 40#50#70#</p>	2
Q2.	(a)	What do you understand by the term Iteration?	1
	(b)	<p>Which is the correct form of declaration of dictionary?</p> <p>(i) Day={1:'monday',2:'tuesday',3:'wednesday'}  (ii) Day=(1,'monday',2,'tuesday',3,'wednesday')  (iii) Day=[1:'monday',2:'tuesday',3:'wednesday']  (iv) Day={1'monday',2'tuesday',3'wednesday'}</p>	1
	(c)	<p>Identify the valid declaration of L:  L = [1, 23, 'hi', 6].</p> <p>(i) list    (ii) dictionary    (iii) array    (iv) tuple</p>	1
	(d)	<p>Find and write the output of the following python code:</p> <pre> x = "abcdef" i = "a" while i in x:     print(i, end = " ") </pre>	1

	(e)	<p>Find and write the output of the following python code:</p> <pre>a=10  def call():     global a     a=15     b=20     print(a) call()</pre>	1
	(f)	<p>What do you understand by local and global scope of variables? How can you access a global variable inside the function, if function has a variable with same name.</p>	2
	(g)	<p>A bar chart is drawn(using pyplot) to represent sales data of various models of cars, for a month. Write appropriate statements in Python to provide labels <b>Month - June</b> and <b>Sale done</b> to x and y axis respectively.</p> <p style="text-align: center;"><b>OR</b></p> <p>Give the output from the given python code:</p> <pre>import matplotlib.pyplot as plt; plt.rcParams() import numpy as np import matplotlib.pyplot as plt  objects = ('Python', 'C++', 'Java', 'Perl', 'Scala', 'Lisp') y_pos = np.arange(len(objects)) performance = [10,8,6,4,2,1]  plt.bar(y_pos, performance, align='center', alpha=0.5) plt.xticks(y_pos, objects) plt.ylabel('Usage') plt.title('Programming language usage')  plt.show()</pre>	2
	(h)	<p>Write a function in python to count the number of lines in a text file '<b>STORY.TXT</b>' which is starting with an alphabet '<b>A</b>' .</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a method/function <b>DISPLAYWORDS()</b> in python to read lines from a text file <b>STORY.TXT</b>, and display those words, which are less than 4 characters.</p>	2
	(i)	<p>Write a Recursive function in python <b>BinarySearch(Arr,I,R,X)</b> to search the given element <b>X</b> to be searched from the List <b>Arr</b> having <b>R</b> elements,where <b>I</b> represents lower bound and <b>R</b> represents the upper bound.</p> <p style="text-align: center;"><b>OR</b></p>	3

		Write a Recursive function <b>recurfactorial(n)</b> in python to calculate and return the factorial of number <b>n</b> passed to the parameter.	
	(j)	<p>Write a function in Python, <b>INSERTQ(Arr,data)</b> and <b>DELETEQ(Arr)</b> for performing insertion and deletion operations in a Queue. <b>Arr</b> is the list used for implementing queue and <b>data</b> is the value to be inserted.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a function in python, <b>MakePush(Package)</b> and <b>MakePop(Package)</b> to add a new Package and delete a Package from a List of Package Description, considering them to act as push and pop operations of the Stack data structure.</p>	4
<b>SECTION-B</b>			
Q.3		Questions 3 (a) to 3 (c) : Fill in the blanks	
	(a)	.....is an example of Public cloud.	1
	(b)	..... is a network of physical objects embedded with electronics, software, sensors and network connectivity.	1
	(c)	----- is a device that forwards data packets along networks.	1
	(d)	----- describes the maximum data transfer rate of a network or Internet connection.	1
	(e)	<p>Give the full forms of the following</p> <ul style="list-style-type: none"> <li>(i) HTTP</li> <li>(ii) FTP</li> <li>(v) VoIP</li> <li>(vi) SSH</li> </ul>	2
	(f)	How many pair of wires are there in twisted pair cable(Ethernet)?What is the name of port ,which is used to connect Ethernet cable to a computer or a labtop?	2
	(g)	<p>Identify the type of cyber crime for the following situations:</p> <ul style="list-style-type: none"> <li>(i) A person complains that Rs. 4.25 lacs have been fraudulently stolen from his/her account online via some online transactions in two days using NET BANKING.</li> <li>(ii) A person complaints that his/her debit/credit card is safe with him still some body has done shopping/ATM transaction on this card.</li> <li>(iii) A person complaints that somebody has created a fake profile on Facebook and defaming his/her character with abusive comments and pictures.</li> </ul>	3
	(h)	<p>Software Development Company has set up its new center at Raipur for its office and web based activities. It has 4 blocks of buildings named Block A, Block B, Block C, Block D.</p> <p style="text-align: center;">Number of Computers</p>	4

Block A	25
Block B	50
Block C	125
Block D	10

Shortest distances between various Blocks in meters:

Block A to Block B	60 m
Block B to Block C	40 m
Block C to Block A	30 m
Block D to Block C	50 m

- (i) Suggest the most suitable place (i.e. block) to house the server of this company with a suitable reason.
- (ii) Suggest the type of network to connect all the blocks with suitable reason .
- (iii)The company is planning to link all the blocks through a secure and high speed wired medium. Suggest a way to connect all the blocks.
- (iv) Suggest the most suitable wired medium for efficiently connecting each computer installed in every block out of the following network cables:
  - Coaxial Cable
  - Ethernet Cable
  - Single Pair Telephone Cable.

### SECTION-C

Q.4	(a)	Which key word is used to sort the records of a table in descending order?	1
	(b)	Which clause is used to sort the records of a table?	1
	(c)	Which command is used to modify the records of the table?	1
	(d)	Which clause is used to remove the duplicating rows of the table?	1
	(e)	Differentiate between Primary key and Candidate key.	2
		<b>OR</b>	
		Differentiate between Degree and Cardinality.	
	(f)	Differentiate between Django GET and POST method.	2
	(g)	Write a output for SQL queries (i) to (iii), which are based on the table: <b>STUDENT</b>	3

		<p>given below:</p> <p style="text-align: center;">Table : <b>STUDENT</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th><b>RollNo</b></th><th><b>Name</b></th><th><b>Class</b></th><th><b>DOB</b></th><th><b>Gender</b></th><th><b>City</b></th><th><b>Marks</b></th></tr> </thead> <tbody> <tr><td>1</td><td>Nanda</td><td>X</td><td>06-06-1995</td><td>M</td><td>Agra</td><td>551</td></tr> <tr><td>2</td><td>Saurabh</td><td>XII</td><td>07-05-1993</td><td>M</td><td>Mumbai</td><td>462</td></tr> <tr><td>3</td><td>Sanal</td><td>XI</td><td>06-05-1994</td><td>F</td><td>Delhi</td><td>400</td></tr> <tr><td>4</td><td>Trisla</td><td>XII</td><td>08-08-1995</td><td>F</td><td>Mumbai</td><td>450</td></tr> <tr><td>5</td><td>Store</td><td>XII</td><td>08-10-1995</td><td>M</td><td>Delhi</td><td>369</td></tr> <tr><td>6</td><td>Marisla</td><td>XI</td><td>12-12-1994</td><td>F</td><td>Dubai</td><td>250</td></tr> <tr><td>7</td><td>Neha</td><td>X</td><td>08-12-1995</td><td>F</td><td>Moscow</td><td>377</td></tr> <tr><td>8</td><td>Nishant</td><td>X</td><td>12-06-1995</td><td>M</td><td>Moscow</td><td>489</td></tr> </tbody> </table> <p>(i)   SELECT COUNT(*), City FROM STUDENT GROUP BY CITY HAVING COUNT(*)&gt;1;      (ii)   SELECT MAX(DOB),MIN(DOB) FROM STUDENT;      (iii)   SELECT NAME,GENDER FROM STUDENT WHERE CITY="Delhi";</p>	<b>RollNo</b>	<b>Name</b>	<b>Class</b>	<b>DOB</b>	<b>Gender</b>	<b>City</b>	<b>Marks</b>	1	Nanda	X	06-06-1995	M	Agra	551	2	Saurabh	XII	07-05-1993	M	Mumbai	462	3	Sanal	XI	06-05-1994	F	Delhi	400	4	Trisla	XII	08-08-1995	F	Mumbai	450	5	Store	XII	08-10-1995	M	Delhi	369	6	Marisla	XI	12-12-1994	F	Dubai	250	7	Neha	X	08-12-1995	F	Moscow	377	8	Nishant	X	12-06-1995	M	Moscow	489	
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	(h)	<p>Write SQL queries for (i) to (iv), which are based on the table: <b>STUDENT</b> given in the question 4(g):</p> <p>(i)   To display the records from table student in alphabetical order as per the name of the student.      (ii)   To display Class, Dob and City whose marks is between 450 and 551.      (iii)   To display Name, Class and total number of students who have secured more than 450 marks, class wise      (iv)   To increase marks of all students by 20 whose class is "XII"</p>	4																																																															

#### SECTION-D

Q.5	(a)	<p>It is an internet service for sending <u>written</u> messages electronically from one computer to another. Write the service name.</p>	1
	(b)	As a citizen of india , What advise you should give to others for e-waste disposal?	1
	(c)	What can be done to reduce the risk of identity theft? Write any two ways.	2

	(d)	<p><b>From:</b> Internal Revenue Service [mailto:admin@irs.gov]  <b>Sent:</b> Wednesday, March 01, 2006 12:45 PM  <b>To:</b> <a href="mailto:john.doe@idoe.com">john.doe@idoe.com</a>  <b>Subject:</b> IRS Notification - Please Read This .</p> <hr/> <p>After the last annual calculations of your fiscal activity we have determined that you are eligible to receive a tax refund of \$63.80. Please submit the tax refund request and allow us 6-9 days in order to process it.</p> <p>A refund can be delayed for a variety of reasons. For example submitting invalid records or applying after the deadline.</p> <p>To access the form for your tax refund, please <a href="#">click here</a></p>	2
	(e)	Differentiate between open source and open data.	2
	(f)	Enumerate any two disability issues while teaching and using computers	2

**COMPUTER SCIENCE - NEW (083)**  
**MARKING SCHEME – SQP (2019-20)**  
**CLASS- XII**

**Max. Marks: 70**

**Time: 3 hrs**

**General Instructions:**

- All questions are compulsory.
- Question paper is divided into 4 sections A, B, C and D.
  - Section A : Unit-1
  - Section B : Unit-2
  - Section C: Unit-3
  - Section D: Unit-4

<b>SECTION-A</b>			
Q1.	(a)	Which of the following is valid arithmetic operator in Python: (i) //      (ii) ?      (iii) <      (iv) and	1
	<b>Ans.</b>	(i) // <b>(1 mark for correct answer)</b>	
	(b)	Write the type of tokens from the following: (i) if (ii) roll_no	1
	<b>Ans.</b>	(i) Key word (ii) Identifier <b>(1/2 mark for each correct type)</b>	
	(c)	Name the Python Library modules which need to be imported to invoke the following functions: <b>(i) sin() (ii) randint ()</b>	1
	<b>Ans.</b>	(i) math (ii) random <b>(1/2 mark for each module)</b>	
	(d)	Rewrite the following code in python after removing all syntax error(s). Underline each correction done in the code. 30=To for K in range(0,To) IF k%4==0: print (K*4) Else: print (K+3)	2
	<b>Ans.</b>	<u>To=30</u> for K in range( <u>0</u> , <u>To</u> ): <u>if</u> k%4==0: print (K*4) <u>else</u> : print (K+3) <b>(1/2 mark for each correction)</b>	
	(e)	Find and write the output of the following python code:  def fun(s): k=len(s)	2

		<pre> m=" " for i in range(0,k):     if(s[i].isupper()):         m=m+s[i].lower()     elif s[i].isalpha():         m=m+s[i].upper()     else:         m=m+'bb' print(m) fun('school2@com') </pre>	
	<b>Ans.</b>	<p>SCHOOLbbbbCOM</p> <p><b>(2 marks for correct output)</b></p> <p>Note: Partial marking can also be given</p>	
	(f)	<p>Find and write the output of the following python code:</p> <pre> def Change(P ,Q=30):     P=P+Q     Q=P-Q     print( P,"#",Q)     return (P)  R=150 S=100 R=Change(R,S) print(R,"#",S) S=Change(S) </pre>	3
	<b>Ans.</b>	<p>250 # 150</p> <p>250 # 100</p> <p>130 # 100</p> <p><b>(1 mark each for correct line)</b></p>	
	(g)	<p>What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code? Also specify the maximum values that can be assigned to each of the variables FROM and TO.</p> <pre> import random AR=[20,30,40,50,60,70]; FROM=random.randint(1,3) TO=random.randint(2,4) for K in range(FROM,TO+1):     print (AR[K],end="# ") </pre> <p>(i) 10#40#70# (ii) 30#40#50#</p>	2

		(iii) 50#60#70# (iv) 40#50#70#	
	<b>Ans.</b>	(ii) 30#40#50# Maximum value FROM,TO is 3,4) (1/2 mark each for maximum value) <b>(1 mark for correct option)</b>	
Q2.	(a)	What do you understand by the term Iteration?	1
	<b>Ans.</b>	Repeation of statement/s finite number of times is known as Iteration. <b>(1 mark for correct answer)</b>	
	(b)	Which is the correct form of declaration of dictionary?  (i) Day={1:'monday',2:'tuesday',3:'wednesday'} (ii) Day=(1;'monday',2;'tuesday',3;'wednesday') (iii) Day=[1:'monday',2:'tuesday',3:'wednesday'] (iv) Day={1'monday',2'tuesday',3'wednesday'}	1
	<b>Ans.</b>	(i) Day={1:'monday',2:'tuesday',3:'wednesday'} <b>(1 mark for correct answer)</b>	
	(c)	Identify the valid declaration of L: L = [1, 23, 'hi', 6]. (i) list      (ii) dictionary    (iii) array      (iv) tuple	1
	<b>Ans.</b>	(i) List <b>(1 mark for correct answer)</b>	
	(d)	Find and write the output of the following python code:  x = "abcdef" i = "a" while i in x: print(i, end = " ")	1
	<b>Ans.</b>	aaaaaa----- <b>OR</b> infinite loop <b>(1 mark for correct answer)</b>	
	(e)	Find and write the output of the following python code:  a=10  def call(): global a a=15 b=20 print(a) call()	1
	<b>Ans.</b>	15	

		<b>(1 mark for correct answer)</b>	
	(f)	What do you understand by local and global scope of variables? How can you access a global variable inside the function, if function has a variable with same name.	2
	<b>Ans.</b>	<p>A global variable is a variable that is accessible globally. A local variable is one that is only accessible to the current scope, such as temporary variables used in a single function definition.</p> <p>A variable declared outside of the function or in global scope is known as global variable. This means, global variable can be accessed inside or outside of the function whereas local variable can be used only inside of the function. We can access by declaring variable as <b>global A</b>.</p> <p><b>(1 mark for correct difference)</b></p> <p><b>(1 mark for explanation)</b></p>	
	(g)	<p>A bar chart is drawn(using pyplot) to represent sales data of various models of cars, for a month. Write appropriate statements in Python to provide labels <b>Month - June</b> and <b>Sale done</b> to x and y axis respectively.</p> <p style="text-align: center;"><b>OR</b></p> <p>Give the output from the given python code:</p> <pre>import matplotlib.pyplot as plt; plt.rcParams() import numpy as np import matplotlib.pyplot as plt  objects = ('Python', 'C++', 'Java', 'Perl', 'Scala', 'Lisp') y_pos = np.arange(len(objects)) performance = [10,8,6,4,2,1]  plt.bar(y_pos, performance, align='center', alpha=0.5) plt.xticks(y_pos, objects) plt.ylabel('Usage') plt.title('Programming language usage')  plt.show()</pre>	2
	<b>Ans.</b>	<pre>import matplotlib.pyplot as plt import numpy as np model=('i20','Grandi10','Creta','Eon','Verna','Tucson','Elantra') y_pos=np.arange(len(model)) sale=[12369,12174,9390,4663,4077,3712,200,150] plt.bar(y_pos,sale,align='center',alpha=0.5) plt.xticks(y_pos,model) plt.xlabel('Month-June') plt.ylabel('Sale done') plt.title('Sales Bar Graph') plt.show()</pre>	

		<p>(1/2 mark for correct plt.bar)</p> <p>(1/2 mark for each correct xlabel and ylabel)</p> <p>(1/2 mark for plt.show)</p>															
		OR															
	(h)	<table border="1"> <caption>Programming language usage</caption> <thead> <tr> <th>Language</th> <th>Usage</th> </tr> </thead> <tbody> <tr> <td>Python</td> <td>10</td> </tr> <tr> <td>C++</td> <td>8</td> </tr> <tr> <td>Java</td> <td>6</td> </tr> <tr> <td>Perl</td> <td>4</td> </tr> <tr> <td>Scala</td> <td>2</td> </tr> <tr> <td>Lisp</td> <td>1</td> </tr> </tbody> </table> <p>(2 marks for correct output)</p>	Language	Usage	Python	10	C++	8	Java	6	Perl	4	Scala	2	Lisp	1	2
Language	Usage																
Python	10																
C++	8																
Java	6																
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	Ans.	<p>Write a function in python to count the number of lines in a text file '<b>STORY.TXT</b>' which is starting with an alphabet '<b>A</b>' .</p> <p style="text-align: center;">OR</p> <p>Write a method/function <b>DISPLAYWORDS()</b> in python to read lines from a text file <b>STORY.TXT</b>, and display those words, which are less than 4 characters.</p> <pre>def COUNTLINES():     file=open('STORY.TXT','r')     lines = file.readlines()     count=0     for w in lines:         if w[0]=="A" or w[0]=="a":             count=count+1         print("Total lines ",count)     file.close()  <b>(½ Mark for opening the file)</b> <b>(½ Mark for reading all lines, and using loop)</b> <b>(½ Mark for checking condition)</b> <b>(½ Mark for printing lines)</b>  OR  def DISPLAYWORDS():     c=0     file=open('STORY.TXT','r')     line = file.read()</pre>															

		<pre> word = line.split() for w in word:     if len(w)&lt;4:         print( w) file.close() <i>(½ Mark for opening the file)</i> <i>(½ Mark for reading line and/or splitting)</i> <i>(½ Mark for checking condition)</i> <i>(½ Mark for printing word)</i> </pre>	
	(i)	<p>Write a Recursive function in python <b>BinarySearch(Arr,I,R,X)</b> to search the given element <b>X</b> to be searched from the List <b>Arr</b> having <b>R</b> elements where <b>I</b> represents lower bound and <b>R</b> represents upper bound.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a Recursive function <b>recurfactorial(n)</b> in python to calculate and return the factorial of number <b>n</b> passed to the parameter.</p>	3
	<b>Ans.</b>	<pre> def BinarySearch (Arr,I,R,X):      if R &gt;= I:         mid = I + (R-I)//2         if Arr[mid] == X:             return mid         elif Arr[mid] &gt; X:             return BinarySearch(Arr,I,mid-1,X)         else:             return BinarySearch(Arr,mid+1,R,X)     else:         return -1  Arr = [ 2, 3, 4, 10, 40 ] X =int(input(' enter element to be searched')) result = BinarySearch(Arr,0,len(Arr)-1,X)  if result != -1:     print ("Element is present at index ", result) else:     print ("Element is not present in array") <i>(1/2 mark for mid)</i> </pre>	

		<p><b>(1/2 mark for return mid)</b>  <b>(1 mark each for returning function)</b>  <b>(1 mark for invoking function)</b></p> <p style="text-align: center;"><b>OR</b></p> <pre>def recurfactorial(n):     if n == 1:         return n     else:         return n*recurfactorial(n-1) num = int(input("Enter a number: ")) if num &lt; 0:     print("Sorry, factorial does not exist for negative numbers") elif num == 0:     print("The factorial of 0 is 1") else:     print("The factorial of",num,"is",recurfactorial(num))</pre> <p><b>(2 marks for correct recursive function)</b>  <b>(1 mark for invoking)</b></p>	
	(j)	<p>Write a function in Python, <b>INSERTQ(Arr,data)</b> and <b>DELETEQ(Arr)</b> for performing insertion and deletion operations in a Queue. <b>Arr</b> is the list used for implementing queue and <b>data</b> is the value to be inserted.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a function in python, <b>MakePush(Package)</b> and <b>MakePop(Package)</b> to add a new Package and delete a Package from a List of Package Description, considering them to act as push and pop operations of the Stack data structure.</p>	4
	<b>Ans.</b>	<pre>def INSERTQ(Arr):     data=int(input("enter data to be inserted: "))     Arr.append(data) def DELETEQ(Arr):     if (Arr==[]):         print( "Queue empty")     else:         print ("Deleted element is: ",Arr[0])         del(Arr[0])</pre> <p><b>( ½ mark insert header)</b>  <b>( ½ mark for accepting a value from user)</b>  <b>( ½ mark for adding value in list)</b>  <b>( ½ mark for delete header)</b>  <b>( ½ mark for checking empty list condition)</b></p>	

	<p><i>(½ mark for displaying "Queue empty")</i>  <i>(½ mark for displaying the value to be deleted)</i>  <i>(½ mark for deleting value from list)</i></p> <p style="text-align: center;"><b>OR</b></p> <pre>def MakePush(Package):     a=int(input("enter package title : "))     Package.append(a) def MakePop(Package):     if (Package==[]):         print( "Stack empty")     else:         print ("Deleted element:",Package.pop())</pre> <p><i>(½ mark for MakePush() header)</i>  <i>(½ mark for accepting a value from user)</i>  <i>(½ mark for adding value in list)</i>  <i>(½ mark for MakePop() header)</i>  <i>(½ mark for checking empty list condition)</i>  <i>(½ mark for displaying "Stack empty")</i>  <i>(½ mark for displaying the value to be deleted)</i>  <i>(½ mark for deleting value from list)</i></p>	
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### SECTION-B

Q.3	Questions 3 (a) to 3 (c) : Fill in the blanks	
	(a) .....is an example of Public cloud.	1
<b>Ans.</b>	Google Drive or any other correct example <b>(1 mark for correct answer)</b>	
	(b) ..... is a network of physical objects embedded with electronics, software, sensors and network connectivity.	1
<b>Ans.</b>	The internet of things <b>OR</b> Internet <b>(1 mark for correct answer)</b>	
	(c) ----- is a device that forwards data packets along networks.	1
<b>Ans.</b>	Router <b>(1 mark for correct answer)</b>	
	(d) ----- describes the maximum data transfer rate of a network or Internet connection.	1
<b>Ans.</b>	Band width <b>(1 mark for correct answer)</b>	
	(e) Give the full forms of the following	2

		(i) HTTP (ii) FTP (iii) VoIP (iv) SSH	
	<b>Ans.</b>	(i) Hyper text transfer protocol (ii) File transfer protocol (iii) Voice over internet protocol (iv) Secure shell  <b>(1/2 mark for each correct expansion)</b>	
	(f)	How many pair of wires are there in twisted pair cable(Ethernet)?What is the name of port ,which is used to connect Ethernet cable to a computer or a laptop?	2
	<b>Ans.</b>	Two insulated copper wires , Ethernet port <b>(1 mark for each correct Answer)</b>	
	(g)	Identify the type of cyber crime for the following situations:  (i) A person complains that Rs. 4.25 lacs have been fraudulently stolen from his/her account online via some online transactions in two days using NET BANKING. (ii) A person complaints that his/her debit/credit card is safe with him still some body has done shopping/ATM transaction on this card. (iii) A person complaints that somebody has created a fake profile on Facebook and defaming his/her character with abusive comments and pictures.	3
	<b>Ans.</b>	(i) Bank Fraud (ii) Identity Theft (iii) Cyber Stalking  <b>(1 mark for each correct answer)</b>	
	(h)	Software Development Company has set up its new center at Raipur for its office and web based activities. It has 4 blocks of buildings named Block A, Block B, Block C, Block D.	4
		Number of Computers	
		Block A	25

Block B	50
Block C	125
Block D	10

Shortest distances between various Blocks in meters:

Block A to Block B	60 m
Block B to Block C	40 m
Block C to Block A	30 m
Block D to Block C	50 m

- (i) Suggest the most suitable place (i.e. block) to house the server of this company with a suitable reason.

**Ans.** Block C , It has maximum number of computer.  
**(1 mark for correct answer )**

- (ii) Suggest the type of network to connect all the blocks with suitable reason .

**Ans.** LAN

**(1 mark for correct answer )**

- (iii)The company is planning to link all the blocks through secure and high-speed wired medium. Suggest a way to connect all the blocks.

**Ans.** Star topology

**OR** Diagram

**(1 mark for correct answer )**

- (iv) Suggest the most suitable wired medium for efficiently connecting each computer installed in every block out of the following network cables:

- Coaxial Cable
- Ethernet Cable
- Single Pair Telephone Cable.

**Ans.** Ethernet Cable

**(1 mark for correct answer )**

### SECTION-C

Q.4	(a)	Which key word is used to sort the records of a table in descending order?	1
	<b>Ans.</b>	DESC  <b>(1 mark for correct answer )</b>	

	(b)	Which clause is used to sort the records of a table?	1
	<b>Ans.</b>	ORDER BY  <b>(1 mark for correct answer )</b>	
	(c)	Which command is used to modify the records of the table?	1
	<b>Ans.</b>	UPDATE  <b>(1 mark for correct answer )</b>	
	(d)	Which clause is used to remove the duplicating rows of the table?	1
	<b>Ans.</b>	DISTINCT  <b>(1 mark for correct answer )</b>	
	(e)	Differentiate between Primary key and Candidate key.  <b>OR</b>  Differentiate between Degree and Cardinality.	2
	<b>Ans.</b>	A Candidate Key can be any column or a combination of columns that can qualify as unique key in database. There can be multiple Candidate Keys in one table where as A Primary Key is a column or a combination of columns that uniquely identify a record. Only one Candidate Key can be Primary Key.  (2 marks for correct difference)  <b>OR</b>  Degree : It is the total number of attributes in the table.  Cardinality: It is the total number of tuples in the table  <b>(2 marks for correct difference)</b>	
	(f)	Differentiate between Django GET and POST method.	2
	<b>Ans.</b>	GET and POST. GET and POST are the only HTTP methods to use when dealing with forms. Django's login form is returned using the POST method, in which the browser bundles up the form data, encodes it for transmission, sends it to the server, and then receives back its response.  Both of these are dictionary-like objects that give you access to GET and POST data. POST data generally is submitted from an HTML <form> , while GET data can come from a <form> or the query string in the page's URL.  <b>(2 Marks for correct difference)</b>	
	(g)	Write a output for SQL queries (i) to (iii), which are based on the table: <b>STUDENT</b> given below:  Table : <b>STUDENT</b>	3

RollNo	Name	Class	DOB	Gender	City	Marks
1	Nanda	X	06-06-1995	M	Agra	551
2	Saurabh	XII	07-05-1993	M	Mumbai	462
3	Sanal	XI	06-05-1994	F	Delhi	400
4	Trisla	XII	08-08-1995	F	Mumbai	450
5	Store	XII	08-10-1995	M	Delhi	369
6	Marisla	XI	12-12-1994	F	Dubai	250
7	Neha	X	08-12-1995	F	Moscow	377
8	Nishant	X	12-06-1995	M	Moscow	489

(i) SELECT COUNT(\*), City FROM STUDENT GROUP BY CITY HAVING COUNT(\*)>1;

**Ans.** COUNT(\*)      City

2                  Mumbai

2                  Delhi

2                  Moscow

**(1 mark for correct output)**

(ii) SELECT MAX(DOB),MIN(DOB) FROM STUDENT;

**Ans.** MAX(DOB)      MIN(DOB)

08-12-1995      07-05-1993

**(1 mark for correct output)**

(iii) SELECT NAME,GENDER FROM STUDENT WHERE CITY="Delhi";

**Ans.** NAME      GENDER

Sanal                  F

Store                  M

**(1 mark for correct output)**

(h) Write SQL queries for (i) to (iv), which are based on the table: **STUDENT** given in the question 4(g):

4

(i) To display the records from table student in alphabetical order as per the name of the student.

**Ans.** SELECT \* FROM STUDENT ORDER BY NAME;

**(1 mark for correct statement)**

(ii) To display Class, Dob and City whose marks is between 450 and 551.

**Ans.** SELECT CLASS,DOB,CITY FROM STUDENT WHERE MARKS  
BETWEEN 450 AND 551;

**(1 mark for correct statement)**

		<p>(iii) To display Name, Class and total number of students who have secured more than 450 marks, class wise.</p> <p><b>Ans.</b> SELECT NAME,CLASS ,COUNT(*) FROM STUDENT GROUP BY CLASS HAVING MARKS&gt;450;</p> <p><b>(1 mark for correct statement)</b></p> <p>(iv) To increase marks of all students by 20 whose class is "XII".</p> <p><b>Ans.</b> UPDATE STUDENT SET MARKS=MARKS+20 where class="XII";</p> <p><b>(1 mark for correct statement)</b></p>	
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#### SECTION-D

Q.5	(a)	<p>It is an internet service for sending <u>written</u> messages electronically from one <u>computer</u> to another. Write the service name.</p>	1
	<b>Ans.</b>	e-mail	
		<b>(1 mark for correct answer)</b>	
	(b)	As a citizen of india , What advise you should give to others for e-waste disposal?	1
	<b>Ans.</b>	As a citizen of india , We can advice the following principle of waste management: Reduce , Reuse and Recycle.	
		<b>(1 mark for correct answer)</b>	
	(c)	What can be done to reduce the risk of identity theft? Write any two ways.	2
	<b>Ans.</b>	1. Don't Give out Personal Information to anyone 2.Don't Carry Your Social Security Card.  (1 mark for each point)	
	(d)	<p><b>From:</b> Internal Revenue Service [mailto:admin@irs.gov]  <b>Sent:</b> Wednesday, March 01, 2006 12:45 PM  <b>To:</b> <a href="mailto:john.doe@idoe.com">john.doe@idoe.com</a>  <b>Subject:</b> IRS Notification - Please Read This .</p> <p>After the last annual calculations of your fiscal activity we have determined that you are eligible to receive a tax refund of \$63.80. Please submit the tax refund request and allow us 6-9 days in order to process it.</p> <p>A refund can be delayed for a variety of reasons. For example submitting invalid records or applying after the deadline.</p> <p>To access the form for your tax refund, please <a href="#">click here</a></p>	2
		Ravi received a mail from IRS department ( as shown above). On clicking " Click-Here" ,he was taken to a site designed to imitate an official-looking website, such as IRS.gov. He uploaded some important information on it.  Identify and explain the cyber crime being discussed in the above scenario.	

	<b>Ans.</b>	It is an example of phishing. phishing is a term used to describe a malicious individual or group of individuals who scam users. They do so by sending e-mails or creating web pages that are designed to collect an individual's online bank, credit card, or other login information.  <b>(1 mark for identification)</b>  <b>(1 mark for explanation)</b>	
	(e)	Differentiate between open source and open data.	2
	<b>Ans.</b>	These licenses are based on the copyright protection of the code; thus, the "open" of open source refers to the source code. Difference between open data and open source is that of data versus application. Data can be numbers, locations, names, etc. <b>(2 Marks for correct difference)</b>	
	(f)	Enumerate any two disability issues while teaching and using computers.	2
	<b>Ans.</b>	There are several types of disabilities that can affect computer accessibility. Although there is no single universally accepted classification, an indicative list of impairments includes the following :Visual impairments: blindness, low vision and color blindness.  <b>(1 mark for each point)</b>	

**Class XII**  
**Computer Science (083)**  
**Sample Question Paper 2018-19**

**Time allowed: 3 Hours**

**Max. Marks: 70**

**General Instructions:**

- (a) All questions are compulsory.
- (b) Programming Language with C++
- (c) In Question 2(b, d), 3 and 4 has internal choices.

<b>Q. No.</b>	<b>Part</b>	<b>Question Description</b>	<b>Marks</b>
1	(a)	Write the type of C++ Operators (Arithmetic, Logical, and Relational Operators) from the following: (i) ! (ii) != (iii) && (iv) %	(2)
	(b)	Observe the following program very carefully and write the name of those header file(s), which are essentially needed to compile and execute the following program successfully: <pre>void main() {     char text[20], newText[20];     gets(text);     strcpy(newText, text);     for(int i=0;i&lt;strlen(text);i++)         if(text[i] == 'A')             text[i] = text[i]+2;     puts(text); }</pre>	(1)
	(c)	Rewrite the following C++ code after removing any/all Syntactical Error(s) with each correction underlined.  <b>Note: Assume all required header files are already being included in the program.</b>  <pre>#define float PI 3.14 void main( ) {     float R=4.5,H=1.5;     A=2*PI*R*H + 2*PIpow(R,2);     cout&lt;&lt;'Area='&lt;&lt;A&lt;&lt;endl; }</pre>	(2)

	(d)	<p>Find and write the output of the following C++ program code:  <b>Note: Assume all required header files are already being included in the program.</b></p> <pre>void main( ) {     int Ar[ ] = { 6 , 3 , 8 , 10 , 4 , 6 , 7} ;     int *Ptr = Ar , I ;     cout&lt;&lt;++*Ptr++ &lt;&lt; '@' ;     I = Ar[3] - Ar[2] ;     cout&lt;&lt;++*(Ptr+I)&lt;&lt;'@'&lt;&lt;"\n" ;     cout&lt;&lt;++I + *Ptr++ &lt;&lt; '@' ;     cout&lt;&lt;*Ptr++ &lt;&lt;'@'&lt;&lt; '\n' ;     for( ; I &gt;=0 ; I -=2)         cout&lt;&lt;Ar[I] &lt;&lt; '@' ; }</pre>	(3)
	(e)	<p>Find and write the output of the following C++ program code:</p> <pre>typedef char STRING[80]; void MIXNOW(STRING S) {     int Size=strlen(S);     for(int I=0;I&lt;Size;I+=2)     {         char WS=S[I];         S[I]=S[I+1];         S[I+1]=WS;     }     for (I=1;I&lt;Size;I+=2)         if (S[I]&gt;='M' &amp;&amp; S[I]&lt;='U')             S[I]='@'; } void main() {     STRING Word="CBSEEXAM2019";     MIXNOW(Word);     cout&lt;&lt;Word&lt;&lt;endl; }</pre>	(2)
	(f)	<p>Observe the following program and find out, which output(s) out of (i) to (iv) will be expected from the program? What will be the minimum and the maximum value assigned to the variable Alter?</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre>void main( ) {     randomize();     int Ar[]={10,7}, N;</pre>	(2)



	(c)	<p>Define a class Ele_Bill in C++ with the following descriptions:</p> <p><b>Private members:</b></p> <table> <tbody> <tr> <td>Cname</td><td>of type character array</td></tr> <tr> <td>Pnumber</td><td>of type long</td></tr> <tr> <td>No_of_units</td><td>of type integer</td></tr> <tr> <td>Amount</td><td>of type float.</td></tr> <tr> <td>Calc_Amount( )</td><td>This member function should calculate the amount as No_of_units*Cost .</td></tr> </tbody> </table> <p>Amount can be calculated according to the following conditions:</p> <p><b>No of units Cost</b></p> <table> <tbody> <tr> <td>First 50 units</td><td>Free</td></tr> <tr> <td>Next 100 units</td><td>0.80 @ unit</td></tr> <tr> <td>Next 200 units</td><td>1.00 @ unit</td></tr> <tr> <td>Remaining units</td><td>1.20 @ unit</td></tr> </tbody> </table> <p><b>Public members:</b></p> <ul style="list-style-type: none"> <li>* A function Accept( ) which allows user to enter Cname, Pnumber, No_of_units and invoke function Calc_Amount().</li> <li>* A function Display( ) to display the values of all the data members on the screen.</li> </ul>	Cname	of type character array	Pnumber	of type long	No_of_units	of type integer	Amount	of type float.	Calc_Amount( )	This member function should calculate the amount as No_of_units*Cost .	First 50 units	Free	Next 100 units	0.80 @ unit	Next 200 units	1.00 @ unit	Remaining units	1.20 @ unit	(4)
Cname	of type character array																				
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Remaining units	1.20 @ unit																				
	(d)	<p>Answer the questions (i) to (iv) based on the following:</p> <pre> class Faculty {     int FCode; protected:     char FName[20]; public:     Faculty();     void Enter();     void Show(); };  class Programme {     int PID; protected:     char Title[30]; public:     Programme();     void Commence();     void View(); };  class Schedule: public Programme, Faculty {     int DD,MM,YYYY; public: </pre>	(4)																		

	<pre> Schedule(); void Start(); void View(); };  void main() {     Schedule S;           //Statement 1     _____     //Statement 2 } </pre>							
(i)	Write the names of all the member functions, which are directly accessible by the object S of class Schedule as declared in main() function.							
(ii)	Write the names of all the members, which are directly accessible by the memberfunction Start( ) of class Schedule.							
(iii)	Write Statement 2 to call function View( ) of class Programme from the object S of class Schedule.							
(iv)	What will be the order of execution of the constructors, when the object S of class Schedule is declared inside main()?							
	<b>OR</b>							
(d)	<p>Consider the following class State :</p> <pre> class State { protected : int tp; public : State( ) { tp=0; } void incTp( ) { tp++; } int getTp(); { return tp; } }; </pre> <p>Write a code in C++ to publically derive another class ‘District’ with the following additional members derived in the public visibility mode.</p> <p><u>Data Members :</u></p> <table> <tr> <td>Dname</td> <td>string</td> </tr> <tr> <td>Distance</td> <td>float</td> </tr> <tr> <td>Population</td> <td>long int</td> </tr> </table> <p><u>Member functions :</u></p> <p>DINPUT( ) : To enter Dname, Distance and population  DOUTPUT( ) : To display the data members on the screen.</p>	Dname	string	Distance	float	Population	long int	
Dname	string							
Distance	float							
Population	long int							

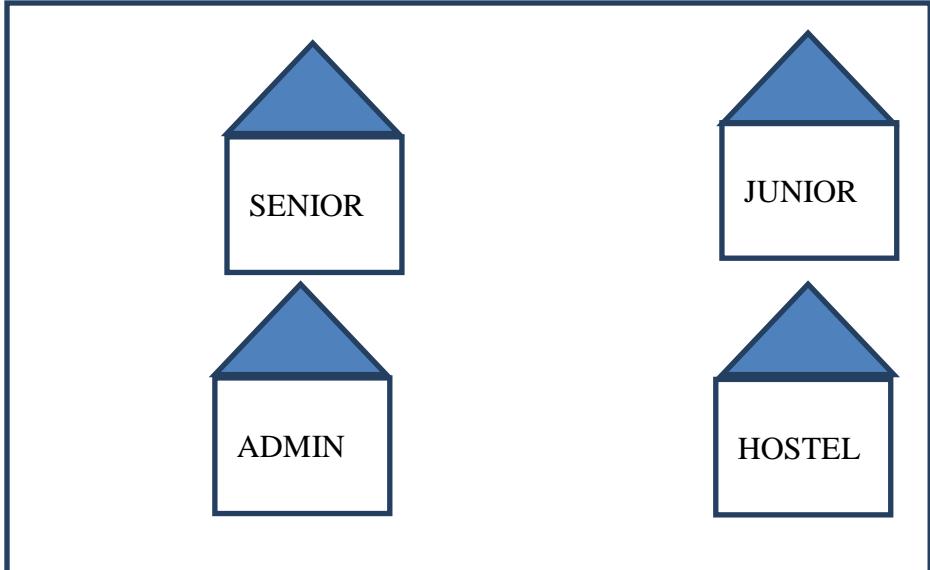
3	<p>(a) Write a user-defined function AddEnd4(int A[][4],int R,int C) in C++ to find and display the sum of all the values, which are ending with 4 (i.e., unit place is 4). For example if the content of array is:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>24</td><td>16</td><td>14</td></tr> <tr><td>19</td><td>5</td><td>4</td></tr> </table> <p>The output should be 42</p> <hr/> <p style="text-align: center;"><b>OR</b></p>	24	16	14	19	5	4	(2)
24	16	14						
19	5	4						
	<p>(a) Write a user defined function in C++ to find the sum of both left and right diagonal elements from a two dimensional array.</p>							
	<p>(b) Write a user-defined function EXTRA_ELE(int A[ ], int B[ ], int N) in C++ to find and display the extra element in Array A. Array A contains all the elements of array B but one more element extra. (Restriction: array elements are not in order)</p> <p>Example      If the elements of Array A is 14, 21, 5, 19, 8, 4, 23, 11 and the elements of Array B is 23, 8, 19, 4, 14, 11, 5 Then output will be 21</p> <hr/> <p style="text-align: center;"><b>OR</b></p>	(3)						
	<p>(b) Write a user defined function Reverse(int A[],int n) which accepts an integer array and its size as arguments(parameters) and reverse the array. Example : if the array is 10,20,30,40,50 then reversed array is 50,40,30,20,10</p>							
	<p>(c) An array S[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of S[5][10], if element S[2][15] is stored at the location 8200.</p> <hr/> <p style="text-align: center;"><b>OR</b></p>	(3)						
	<p>(c) An array A[30][10] is stored in the memory with each element requiring 4 bytes of storage ,if the base address of A is 4500 ,Find out memory locations of A[12][8], if the content is stored along the row.</p>							
	<p>(d) Write the definition of a member function Ins_Player() for a class CQUEUE in C++, to add a Player in a statically allocated circular queue of PLAYERS considering the following code is already written as a part of the program:</p> <pre style="font-family: monospace;">struct Player {     long Pid;     char Pname[20];</pre>	(4)						

		<pre> };  const int size=10; class CQUEUE {     Player Ar[size];     int Front, Rear; public:     CQUEUE()     {         Front = -1;         Rear = -1;     }     void Ins_Player(); // To add player in a static circular queue     void Del_Player(); // To remove player from a static circular queue     void Show_Player(); // To display static circular queue }; </pre>		
		<b>OR</b>		
	(d)	<p>Write a function in C++ to delete a node containing Books information ,from a dynamically allocated stack of Books implemented with the help of the following structure:</p> <pre> struct Book { int BNo; char BName[20]; Book *Next; }; </pre>		
	(e)	<p>Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.</p> <p>A/B+C*(D-E)</p>		
		<b>OR</b>		
		<p>Evaluate the following Postfix expression :</p> <p>4,10,5,+,* ,15,3,/-</p>		
4	(a)	<p>Write a function RevText() to read a text file “ Input.txt “ and Print only word starting with ‘I’ in reverse order .</p> <p><b>Example: If value in text file is: INDIA IS MY COUNTRY</b></p> <p><b>Output will be: AIDNI SI MY COUNTRY</b></p>		
		<b>OR</b>		
	(a)	<p>Write a function in C++ to count the number of lowercase alphabets present in a text file “BOOK..txt”.</p>		

	(b)	<p>Write a function in C++ to search and display details, whose destination is “Cochin” from binary file “Bus.Dat”. Assuming the binary file is containing the objects of the following class:</p> <pre> class BUS {     int Bno;           // Bus Number     char From[20];    // Bus Starting Point     char To[20];      // Bus Destination public:     char * StartFrom(); { return From; }     char * EndTo(); { return To; }     void input() { cin&gt;&gt;Bno&gt;&gt;; gets(From); get(To); }     void show() { cout&lt;&lt;Bno&lt;&lt;“.”&lt;&lt;From &lt;&lt;“.” &lt;&lt;To&lt;&lt;endl; } }; </pre> <hr/> <p style="text-align: center;"><b>OR</b></p>	(3)
	(b)	<p>Write a function in C++ to add more new objects at the bottom of a binary file "STUDENT.dat", assuming the binary file is containing the objects of the following class :</p> <pre> class STU { int Rno; char Sname[20]; public: void Enter() { cin&gt;&gt;Rno;gets(Sname); } void show() { cout &lt;&lt; Rno&lt;&lt;sname&lt;&lt;endl; } }; </pre>	
	(c)	<p>Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 500 products.</p> <pre> class PRODUCT {     int PCode;char PName[20]; public:     void Entry();void Disp(); }; void main() {     fstream In;     In.open("PRODUCT.DAT",ios::binary ios::in);     PRODUCT P;     In.seekg(0,ios::end);     cout&lt;&lt;"Total Count: "&lt;&lt;In.tellg()/sizeof(P)&lt;&lt;endl; } </pre>	(1)

		<pre> In.seekg(70*sizeof(P)); In.read((char*)&amp;P, sizeof(P)); In.read((char*)&amp;P, sizeof(P)); cout&lt;&lt;"At Product:"&lt;&lt;In.tellg()/sizeof(P) + 1; In.close(); } </pre> <p style="text-align: center;"><b>OR</b></p> <p>(c) Which file stream is required for seekg() ?</p>																																																																							
5	(a)	<p>Observe the following table and answer the parts(i) and(ii) accordingly</p> <p><b>Table:Product</b></p> <table border="1"> <thead> <tr> <th>Pno</th><th>Name</th><th>Qty</th><th>PurchaseDate</th></tr> </thead> <tbody> <tr> <td>101</td><td>Pen</td><td>102</td><td>12-12-2011</td></tr> <tr> <td>102</td><td>Pencil</td><td>201</td><td>21-02-2013</td></tr> <tr> <td>103</td><td>Eraser</td><td>90</td><td>09-08-2010</td></tr> <tr> <td>109</td><td>Sharpener</td><td>90</td><td>31-08-2012</td></tr> <tr> <td>113</td><td>Clips</td><td>900</td><td>12-12-2011</td></tr> </tbody> </table> <p>(i) Write the names of most appropriate columns, which can be considered as candidate keys.</p> <p>(ii) What is the degree and cardinality of the above table?</p>	Pno	Name	Qty	PurchaseDate	101	Pen	102	12-12-2011	102	Pencil	201	21-02-2013	103	Eraser	90	09-08-2010	109	Sharpener	90	31-08-2012	113	Clips	900	12-12-2011	(2)																																														
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	(b)	<p>Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables.</p> <p style="text-align: center;"><b>TRAINER</b></p> <table border="1"> <thead> <tr> <th>TID</th><th>TNAME</th><th>CITY</th><th>HIREDATE</th><th>SALARY</th></tr> </thead> <tbody> <tr> <td>101</td><td>SUNAINA</td><td>MUMBAI</td><td>1998-10-15</td><td>90000</td></tr> <tr> <td>102</td><td>ANAMIKA</td><td>DELHI</td><td>1994-12-24</td><td>80000</td></tr> <tr> <td>103</td><td>DEEPTI</td><td>CHANDIGARG</td><td>2001-12-21</td><td>82000</td></tr> <tr> <td>104</td><td>MEENAKSHI</td><td>DELHI</td><td>2002-12-25</td><td>78000</td></tr> <tr> <td>105</td><td>RICHA</td><td>MUMBAI</td><td>1996-01-12</td><td>95000</td></tr> <tr> <td>106</td><td>MANIPRABHA</td><td>CHENNAI</td><td>2001-12-12</td><td>69000</td></tr> </tbody> </table> <p style="text-align: center;"><b>COURSE</b></p> <table border="1"> <thead> <tr> <th>CID</th><th>CNAME</th><th>FEES</th><th>STARTDATE</th><th>TID</th></tr> </thead> <tbody> <tr> <td>C201</td><td>AGDCA</td><td>12000</td><td>2018-07-02</td><td>101</td></tr> <tr> <td>C202</td><td>ADCA</td><td>15000</td><td>2018-07-15</td><td>103</td></tr> <tr> <td>C203</td><td>DCA</td><td>10000</td><td>2018-10-01</td><td>102</td></tr> <tr> <td>C204</td><td>DDTP</td><td>9000</td><td>2018-09-15</td><td>104</td></tr> <tr> <td>C205</td><td>DHN</td><td>20000</td><td>2018-08-01</td><td>101</td></tr> <tr> <td>C206</td><td>O LEVEL</td><td>18000</td><td>2018-07-25</td><td>105</td></tr> </tbody> </table>	TID	TNAME	CITY	HIREDATE	SALARY	101	SUNAINA	MUMBAI	1998-10-15	90000	102	ANAMIKA	DELHI	1994-12-24	80000	103	DEEPTI	CHANDIGARG	2001-12-21	82000	104	MEENAKSHI	DELHI	2002-12-25	78000	105	RICHA	MUMBAI	1996-01-12	95000	106	MANIPRABHA	CHENNAI	2001-12-12	69000	CID	CNAME	FEES	STARTDATE	TID	C201	AGDCA	12000	2018-07-02	101	C202	ADCA	15000	2018-07-15	103	C203	DCA	10000	2018-10-01	102	C204	DDTP	9000	2018-09-15	104	C205	DHN	20000	2018-08-01	101	C206	O LEVEL	18000	2018-07-25	105	(4+2)
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	(i)	Display the Trainer Name, City & Salary in descending order of their Hiredate.																																					
	(ii)	To display the TNAME and CITY of Trainer who joined the Institute in the month of December 2001.																																					
	(iii)	To display TNAME, HIREDATE, CNAME, STARTDATE from tables TRAINER and COURSE of all those courses whose FEES is less than or equal to 10000.																																					
	(iv)	To display number of Trainers from each city.																																					
	(v)	SELECT TID, TNAME, FROM TRAINER WHERE CITY NOT IN('DELHI', 'MUMBAI');																																					
	(vi)	SELECT DISTINCT TID FROM COURSE;																																					
	(vii)	SELECT TID, COUNT(*), MIN(FEES) FROM COURSE GROUP BY TID HAVING COUNT(*)>1;																																					
	(viii)	SELECT COUNT(*), SUM(FEES) FROM COURSE WHERE STARTDATE< '2018-09-15';																																					
6	(a)	State any one Distributive Law of Boolean Algebra and Verify it using truth table.	(2)																																				
	(b)	Draw the Logic Circuit of the following Boolean Expression: $((U + V').(U + W)).(V + W')$	(2)																																				
	(c)	Derive a Canonical SOP expression for a Boolean function F(X,Y,Z) represented by the following truth table:  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th><th>Y</th><th>Z</th><th>F(X,Y,Z)</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	X	Y	Z	F(X,Y,Z)	0	0	0	1	0	0	1	1	0	1	0	0	0	1	1	0	1	0	0	1	1	0	1	0	1	1	0	0	1	1	1	1	(1)
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	(d)	Reduce the following Boolean Expression to its simplest form using K-Map:  $F(X,Y,Z,W) = \Sigma (0,1,2,3,4,5,8,10,11,14)$	(3)																																				

7	(a) Arun opened his e-mail and found that his inbox was full of hundreds of unwanted mails. It took him around two hours to delete these unwanted mails and find the relevant ones in his inbox. What may be the cause of his receiving so many unsolicited mails? What can Arun do to prevent this happening in future?	(2)
(b)	Assume that 50 employees are working in an organization. Each employee has been allotted a separate workstation to work. In this way, all computers are connected through the server and all these workstations are distributed over two floors. In each floor, all the computers are connected to a switch. Identify the type of network?	(1)
(c)	Your friend wishes to install a wireless network in his office. Explain him the difference between guided and unguided media.	(1)
(d)	Write the expanded names for the following abbreviated terms used in Networking and Communications: (i) CDMA    (ii) HTTP    (iii)    XML    (iv)    URL	(2)
(e)	<p>Multipurpose Public School, Bangluru is Setting up the network between its Different Wings of school campus. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTEL(H).</p> <p>Multipurpose Public School, Bangluru</p>  <pre> graph TD     SENIOR[SENIOR] --- M(( ))     JUNIOR[JUNIOR] --- M     ADMIN[ADMIN] --- M     HOSTEL[HOSTEL] --- M     </pre>	(4)

	<p>Distance between various wings are given below:</p> <table border="1"> <tbody> <tr> <td>Wing A to Wing S</td><td>100m</td></tr> <tr> <td>Wing A to Wing J</td><td>200m</td></tr> <tr> <td>Wing A to Wing H</td><td>400m</td></tr> <tr> <td>Wing S to Wing J</td><td>300m</td></tr> <tr> <td>Wing S to Wing H</td><td>100m</td></tr> <tr> <td>Wing J to Wing H</td><td>450m</td></tr> </tbody> </table> <p>Number of Computers installed at various wings are as follows:</p> <table border="1"> <thead> <tr> <th><u>Wings</u></th><th><u>Number of Computers</u></th></tr> </thead> <tbody> <tr> <td>Wing A</td><td>20</td></tr> <tr> <td>Wing S</td><td>150</td></tr> <tr> <td>Wing J</td><td>50</td></tr> <tr> <td>Wing H</td><td>25</td></tr> </tbody> </table>	Wing A to Wing S	100m	Wing A to Wing J	200m	Wing A to Wing H	400m	Wing S to Wing J	300m	Wing S to Wing H	100m	Wing J to Wing H	450m	<u>Wings</u>	<u>Number of Computers</u>	Wing A	20	Wing S	150	Wing J	50	Wing H	25	
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(i)	Suggest the best wired medium and draw the cable layout to efficiently connect various wings of Multipurpose Public School, Bangalore.																							
(ii)	Name the most suitable wing where the Servers should be installed. Justify your answer.																							
(iii)	Suggest a device/software and its placement that would provide data security for the entire network of the School.																							
(iv)	Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the campus of Multipurpose Public School, Bangalore.																							

# SAMPLE QUESTION PAPER 2018-19

## Marking Scheme COMPUTER SCIENCE (Code: 083)

### CLASS:-XII

**Time:3 Hrs.**

**M.M.:70**

<b>Q. No.</b>	<b>Part</b>	<b>Question Description</b>	<b>Marks</b>
1	(a)	<p>Write the type of C++ Operators (Arithmetic, Logical, and Relational Operators) from the following:</p> <p>(i) !(ii) !=(iii) &amp;&amp;(iv) %</p>	2
	Ans.	<p>(i) Logical   (ii) Relational   (iii)Logical   (iv) Arithmetic</p> <p>(1/2 Mark for each correct Operator Type)</p>	
	(b)	<p>Observe the following program very carefully and write the name of those header file(s), which are essentially needed to compile and execute the following program successfully:</p> <pre>void main() {     char text[20], newText[20];     gets(text);     strcpy(newText,text);     for(int i=0;i&lt;strlen(text);i++)         if(text[i]==’A’)             text[i]=text[i]+2;     puts(text); }</pre>	1
	Ans.	<ul style="list-style-type: none"> <li>• stdio.h</li> <li>• string.h</li> </ul> <p>(1/2 Mark for writing each correct header file) NOTE: Any other header file to be ignored</p>	
	(c)	<p>Rewrite the following C++ code after removing any/all Syntactical Error(s) with each correction underlined.</p> <p><b>Note: Assume all required header files are already being included in the program.</b></p> <pre>#define float PI 3.14 void main( ) {     float R=4.5,H=1.5;     A=2*PI*R*H + 2*PIpow(R,2);     cout&lt;&lt;‘Area=’&lt;&lt;A&lt;&lt;endl;</pre>	(2)

	<pre>#define PI 3.14//Error 1 void main( ) {     float R=4.5,H=1.5;     floatA=2*PI*R*H + 2*PI*pow(R,2);      //Error 2, 3     cout&lt;&lt;“Area=”&lt;&lt;A&lt;&lt;endl;           //Error 4 }</pre> <p>(½ Mark for each correction) OR (1 mark for identifying the errors, without suggesting corrections)</p>	
(d)	<p>Find and write the output of the following C++ program code:</p> <p><b>Note: Assume all required header files are already being included in the program.</b></p> <pre>void main( ) {     int Ar[ ] = { 6 , 3 , 8 , 10 , 4 , 6 , 7 } ;     int *Ptr = Ar , I ;     cout&lt;&lt;++*Ptr++ &lt;&lt; '@' ;     I = Ar[3] - Ar[2] ;     cout&lt;&lt;++*(Ptr+I)&lt;&lt;'@'&lt;&lt;"\n" ;     cout&lt;&lt;++I + *Ptr++ &lt;&lt; '@' ;     cout&lt;&lt;*Ptr++ &lt;&lt;'@'&lt;&lt; '\n' ;     for( ; I &gt;=0 ; I -=2)         cout&lt;&lt;Ar[I] &lt;&lt; '@' ; }</pre>	(3)
Ans	<p>7@11@ 6@8@ 11@3@</p> <p>(½ Mark for writing each correct value) OR (Only ½ Mark for writing all ‘@’ at proper places)</p> <p>Note:</p> <ul style="list-style-type: none"> <li>● Deduct only ½ Mark for not considering any or all correct placements of @</li> <li>● Deduct only ½ Mark for not considering any or all line break</li> </ul>	
(e)	<p>Find and write the output of the following C++ program code:</p> <pre>typedef char STRING[80]; void MIXNOW(STRING S) {     int Size=strlen(S);     for(int I=0;I&lt;Size;I+=2)     {         char WS=S[I];</pre>	(2)



2 3	<p>(a) What is a copy constructor? Illustrate with a suitable C++ example. (2)</p> <p>Ans. A copy constructor is an overloaded constructor in which an object of the same class is passed as reference parameter.</p> <pre style="font-family: monospace; margin-left: 20px;"> class X {     int a; public:     X()     {         a=0;     }     X(X &amp;ob)          //copy constructor     {         a=ob.a;     } };</pre> <p>(Full 2 Marks to be awarded if the copy constructor is explained with an appropriate example)</p> <p>OR</p> <p>(1 Mark for correct explanation of copy constructor only without an example)</p>	
	<p>(b) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the Function 1 to Function 4. (2)</p> <pre style="font-family: monospace; margin-left: 20px;"> void My_fun ()                                // Function 1 {     for (int I=1 ; I&lt;=50 ; I++) cout&lt;&lt; "-" ;     cout&lt;&lt;endl ; } void My_fun (int N)                          // Function 2 {     for (int I=1 ; I&lt;=N ; I++) cout&lt;&lt;"*" ;     cout&lt;&lt;endl ; } void My_fun (int A, int B)                  // Function 3 {     for (int I=1 ; I&lt;=B ; I++) cout &lt;&lt;A*I ;     cout&lt;&lt;endl ; } void My_fun (char T, int N)                // Function 4 {     for (int I=1 ; I&lt;=N ; I++) cout&lt;&lt;T ;     cout&lt;&lt;endl;</pre>	

	<pre> } void main ( ) {     int X=7, Y=4, Z=3;     char C='#';     My_fun (C,Y);     My_fun (X,Z); } </pre>											
	<b>OR</b>											
	<p>Write any four differences between Constructor and Destructor function with respect to object oriented programming</p>											
Ans.	<p>#### 71421 Polymorphism OR Function Overloading</p>											
	<b>OR</b>											
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 2px;"><b>Constructor</b></th><th style="text-align: center; padding: 2px;"><b>Destructor</b></th></tr> </thead> <tbody> <tr> <td style="padding: 2px;">Name of the constructor function is same as that of class</td><td style="padding: 2px;">Name of the destructor function is same as that of class preceded by ~</td></tr> <tr> <td style="padding: 2px;">Constructor functions are called automatically at the time of creation of the object</td><td style="padding: 2px;">Destructor functions are called automatically when the scope of the object gets over</td></tr> <tr> <td style="padding: 2px;">Constructor can be overloaded</td><td style="padding: 2px;">Destructor can not be overloaded</td></tr> <tr> <td style="padding: 2px;">Constructor is used to initialize the data members of the class</td><td style="padding: 2px;">Destructor is used to de-initialize the data members of the class</td></tr> </tbody> </table>	<b>Constructor</b>	<b>Destructor</b>	Name of the constructor function is same as that of class	Name of the destructor function is same as that of class preceded by ~	Constructor functions are called automatically at the time of creation of the object	Destructor functions are called automatically when the scope of the object gets over	Constructor can be overloaded	Destructor can not be overloaded	Constructor is used to initialize the data members of the class	Destructor is used to de-initialize the data members of the class	
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	<i>(½ Mark for writing each correct line of output)</i> <i>(1 Mark for writing the feature name correctly)</i>											
	<b>OR</b>											
	<i>(½ Mark for writing each correct difference)</i>											
(c)	<p>Define a class Ele_Bill in C++ with the following descriptions:</p> <p><b><u>Private members:</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Cname</td><td style="width: 60%;">of type character array</td></tr> <tr> <td>Pnumber</td><td>of type long</td></tr> <tr> <td>No_of_units</td><td>of type integer</td></tr> <tr> <td>Amount</td><td>of type float.</td></tr> <tr> <td>Calc_Amount( )</td><td>This member function should calculate the amount as No_of_units*Cost .</td></tr> </table>	Cname	of type character array	Pnumber	of type long	No_of_units	of type integer	Amount	of type float.	Calc_Amount( )	This member function should calculate the amount as No_of_units*Cost .	(4)
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	<p>Amount can be calculated according to the following conditions:</p> <p><b>No of units Cost</b></p> <table border="0"> <tbody> <tr> <td>First 50 units</td><td>Free</td></tr> <tr> <td>Next 100 units</td><td>0.80 @ unit</td></tr> <tr> <td>Next 200 units</td><td>1.00 @ unit</td></tr> <tr> <td>Remaining units</td><td>1.20 @ unit</td></tr> </tbody> </table> <p><b>Public members:</b></p> <ul style="list-style-type: none"> <li>* A function Accept( ) which allows user to enter Cname, Pnumber, No_of_units and invoke function Calc_Amount().</li> <li>* A function Display( ) to display the values of all the data members on the screen.</li> </ul>	First 50 units	Free	Next 100 units	0.80 @ unit	Next 200 units	1.00 @ unit	Remaining units	1.20 @ unit
First 50 units	Free								
Next 100 units	0.80 @ unit								
Next 200 units	1.00 @ unit								
Remaining units	1.20 @ unit								
Ans.	<pre>class Ele_Bill {     char Cname[20];     long Pnumber;     int No_of_units;     float Amount;     void Calc_Amount(); public:     void Accept();     void Display(); };  void Ele_Bill :: Calc_Amount() {     if(No_of_units&lt;=50)     {         Amount=0;     }     else if(No_of_units&lt;=150)     {         Amount=(No_of_units-50)*0.80;     }     else if(No_of_units&lt;=350)     {         Amount=80+(No_of_units-150)*1.00;     }     else     {         Amount=80+200+(No_of_units-350)*1.20;     } }  void Ele_Bill :: Accept()</pre>								

	<pre>     {         gets(Cname);         cin&gt;Pnumber&gt;&gt;No_of_units;         Calc_Amount( );     }     void Ele_Bill :: Display( )     {         cout&lt;&lt;Cname&lt;&lt;Pnumber&lt;&lt;No_of_units&lt;&lt;Amount;     } </pre>	
	<p>(½ Mark for declaring class header correctly)  (½ Mark for declaring data members correctly)  (1 Mark for defining Calc_Amount() correctly)  (½ Mark for taking inputs of Cname, Pnumber and No_of_units in Accept())  (½ Mark for invoking Calc_Amount() inside Accept())  (½ Mark for defining Display() correctly)  (½ Mark for correctly closing class declaration with a semicolon ; )</p> <p><b>NOTE:</b>  <b>Marks to be awarded for defining the member functions inside or outside the class</b></p>	
(d)	<p>Answer the questions (i) to (iv) based on the following:</p> <pre> class Faculty {     int FCode; protected:     char FName[20]; public:     Faculty();     void Enter();     void Show(); };  class Programme {     int PID; protected:     char Title[30]; public:     Programme();     void Commence();     void View(); };  class Schedule: public Programme, Faculty {     int DD,MM,YYYY; public:     Schedule(); </pre>	(4)

	<pre> void Start(); void View(); };  void main() {     Schedule S;           //Statement 1     _____                 //Statement 2 } </pre>	
	<b>OR</b>	
	<p>Consider the following class State :</p> <pre> class State { protected : int tp; public : State( ) { tp=0; } void incTp( ) { tp++; } int getTp(); { return tp; } }; </pre> <p>Write a code in C++ to publically derive another class ‘District’ with the following additional members derived in the public visibility mode.</p> <p><u>Data Members :</u></p> <p>Dname            string  Distance        float  Population      long int</p> <p><u>Member functions :</u></p> <p>DINPUT( ) : To enter Dname, Distance and population  DOUTPUT( ) : To display the data members on the screen.</p>	
(i)	Write the names of all the member functions, which are directly accessible by the object S of class Schedule as declared in main() function.	
Ans.	<p>Start(), Schedule::View(), Commence(), Programme::View()</p> <p>(1 Mark for writing all correct member names )</p> <p>NOTE:</p> <ul style="list-style-type: none"> <li>● Ignore the mention of Constructors</li> </ul>	
(ii)	Write the names of all the members, which are directly accessible by the memberfunction Start( ) of class Schedule.	
Ans.	<p>DD,MM,YYYY, Schedule::View()  Title, Commence( ), Programme::View()  Fname, Enter(), Show()</p> <p>(1 Mark for writing all correct member names )</p>	

	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>● Marks not to be awarded for partially correct answer</li> <li>● Ignore the mention of Constructors</li> </ul>
(iii)	Write Statement 2 to call function View( ) of class Programme from the object S of class Schedule.
Ans.	S.Programme::View( );  (1 Mark for writing Statement 2 correctly)
(iv)	What will be the order of execution of the constructors, when the object S of class Schedule is declared inside main()?
Ans.	Programme( ), Faculty( ), Schedule( )
	<b>OR</b>
Ans.	<pre>class District : public State { public : char      Dname[20]; float     Distance; long int   Population; void  DINPUT() {     gets(Dname);     cin&gt;&gt;distance;     cin&gt;&gt;Population; } void  DOUTPUT() {     cout&lt;&lt;Dname&lt;&lt;endl;     cout&lt;&lt;Distance&lt;&lt;endl;     cout&lt;&lt;population&lt;&lt;endl; } };</pre>
	(1 Mark for writing correct order) <ul style="list-style-type: none"> <li>● No Marks to be awarded for any other combination/order.</li> <li>● Names of the constructor/class without parenthesis is acceptable</li> </ul>
	<b>OR</b>
	(1 Mark for correct syntax for derived class header) (½ Mark for writing public : ) (½ Mark for correct declaration of data members Dname ,Distance and Population) (1 Mark for defining the function DINPUT( )) (1 Mark for defining the function DOUTPUT( ))

(a) Ans.	<p>Write a user-defined function AddEnd4(int A[][4],int R,int C) in C++ to find and display the sum of all the values, which are ending with 4 (i.e., unit place is 4).</p> <p>For example if the content of array is:</p> <table border="1" data-bbox="693 242 873 327"> <tr> <td>24</td> <td>16</td> <td>14</td> </tr> <tr> <td>19</td> <td>5</td> <td>4</td> </tr> </table> <p>The output should be 42</p> <hr/> <p style="text-align: center;"><b>OR</b></p> <hr/> <p>Write a user defined function in C++ to find the sum of both left and right diagonal elements from a two dimensional array.</p> <hr/> <pre>void AddEnd4(int A[ ][4], int R, int C) {     int I,J,sum=0;     for(I=0;I&lt;R;I++)     {         for(J=0;J&lt;C;J++)         if(A[I][J]%10 ==4)             sum=sum+A[I][J];     }     cout&lt;&lt;sum; }</pre> <hr/> <p style="text-align: center;"><b>OR</b></p> <hr/> <pre>void Diagsumboth(int A[][], int n) { int sumLt=0,sumRt=0; for(int i=0;i&lt;n;i++) { sumLt+=A[i][i]; else sumRt+=A[n-1-i][i]; } cout&lt;&lt;"sum of left diagonal"&lt;&lt;sumLt&lt;&lt;endl; cout&lt;&lt;"sum of right diagonal"&lt;&lt;sumRt&lt;&lt;endl; }</pre> <hr/> <p>(½ Mark for correct loops)  (½ Mark for correct checking values ending with 4)  ( ½ Mark for finding sum of values)  ( ½ Mark for displaying the sum )</p> <hr/> <p style="text-align: center;"><b>OR</b></p> <hr/> <p>(1/2 Mark for correct loop)  (1/2 Mark each for calculating sum of left or right diagonals)  (1/2 Mark for displaying)</p>	24	16	14	19	5	4	(2)
24	16	14						
19	5	4						

(b)	<p>Write a user-defined function EXTRA_ELE(int A[ ], int B[ ], int N) in C++ to find and display the extra element in Array A. Array A contains all the elements of array B but one more element extra. (Restriction: array elements are not in order)</p> <p><b>Example</b>      If the elements of Array A is 14, 21, 5, 19, 8, 4, 23, 11 and the elements of Array B is 23, 8, 19, 4, 14, 11, 5 Then output will be 21</p>	(3)
Ans.	<p><b>OR</b></p> <p>Write a user defined function Reverse(int A[],int n) which accepts an integer array and its size as arguments(parameters) and reverse the array.</p> <p><b>Example : if the array is 10,20,30,40,50 then reversed array is 50,40,30,20,10</b></p> <pre>void EXTRA_ELE(int A[], int B[],int N) {     int i,j,flag=0;     for(i=0;i&lt;N;i++)     {         for(j=0;j&lt;N;j++)         {             if(A[i]==B[j])             {                 flag=1;                 break;             }         }         if(flag==0)             cout&lt;&lt;"Extra element"&lt;&lt;A[i];     flag=0;     } }</pre>	
<b>OR</b>		
<pre>void Reverse( int A[ ] , int n) { int temp; for(int i=0;i&lt;n/2;i++) { temp=A[i]; A[i]=A[n-1-i]; A[n-1-i]=temp; } }</pre> <p>(1 Mark for correct loops) (1 Mark for checking array elements which are equal) (½ Mark for display the extra element)</p>		

	<b>OR</b> (1 Mark for correct loop) (2 Marks for swapping elements)	
(c)	<p>An array S[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of S[5][10], if element S[2][15] is stored at the location 8200.</p> <p style="text-align: center;"><b>OR</b></p> <p>An array A[30][10] is stored in the memory with each element requiring 4 bytes of storage ,if the base address of A is 4500 ,Find out memory locations of A[12][8], if the content is stored along the row.</p>	(3)
Ans.	<p><b>OPTION 1:</b>  <b>ASSUMING LBR=LBC=0</b>  <b>W=2 BYTES, NUMBER OF ROWS(M)=10, NUMBER OF COLUMNS(N)=30</b>  <math>LOC(S[I][J]) = B + (I + J*M)*W</math>  <math>LOC(S[2][15]) = B + (2+15*10)* 2</math>  <math>8200 = B + (152*2)</math>  <math>B = 8200 - 304</math>  <math>B = 7896</math>  <math>LOC(S[5][10]) = 7896 +(5+10*10)* 2</math>  <math>= 7896 + (105*2)</math>  <math>= 7896 + 210</math>  <math>= 8106</math></p> <p><b>OPTION 2:</b>  <b>ASSUMING LBR=2,LBC=15 AND B = 8200</b>  <b>W=2 BYTES, NUMBER OF ROWS(M)=10, NUMBER OF COLUMNS(N)=30</b>  <math>LOC(S[I][J]) = B + ((I-LBR) + (J-LBC)*M)*W</math>  <math>LOC(S[5][10])= 8200 + ((5-2) + (10-15)*10)*2</math>  <math>= 8200 + (3 + (-5)*10) * 2</math>  <math>= 8200 + (3 + (-50)) * 2</math>  <math>= 8200 + (3 - 50) * 2</math>  <math>= 8200 + (-47) * 2</math>  <math>= 8200 - 94</math>  <math>= 8106</math></p> <p style="text-align: center;"><b>OR</b></p> <p>Loc of A[12][8]= <math>B+W*(N*(I-LBR)+(J-LBC))</math>  <math>=4500+4*(10*12+8)</math>  <math>= 4500 + 4*(128)</math>  <math>=4500 + 512</math>  <math>= 5012</math></p>	

	<p>1 Mark for writing correct formula (for column major)      OR substituting formula with correct values)      (1 Mark for correct step calculations)      (1 Mark for final correct address)</p> <p style="text-align: center;"><b>OR</b></p> <p>1 Mark for writing correct formula (for Row major)      OR substituting formula with correct values)      (1 Mark for correct step calculations)      (1 Mark for final correct address)</p>	
(d)	<p>Write the definition of a member function Ins_Player() for a class CQUEUE in C++, to add a Player in a statically allocated circular queue of PLAYERS considering the following code is already written as a part of the program:</p> <pre>struct Player {     long Pid;     char Pname[20]; };  const int size=10; class CQUEUE {     Player Ar[size];     int Front, Rear; public:     CQUEUE( )     {         Front = -1;         Rear=-1;     }     void Ins_Player(); // To add player in a static circular queue     void Del_Player(); // To remove player from a static circular queue     void Show_Player(); // To display static circular queue };</pre> <p style="text-align: center;"><b>OR</b></p> <p>Write a function in C++ to delete a node containing Books information ,from a dynamically allocated stack of Books implemented with the help of the following structure:</p> <pre>struct Book {     int BNo;     char BName[20];     Book *Next; };</pre>	(4)

Ans.	<pre> void CQUEUE :: Ins_Player( ) {     if((Front==0 &amp;&amp; Rear==size-1)    (Front==Rear+1)     {         cout&lt;&lt; "Overflow";         return;     }     else if(Rear == -1)     {         Front=0;         Rear=0;     }     else if(Rear==size-1)     {         Rear=0;     }     else     {         Rear++;     }     cout&lt;&lt; "Enter Player Id=";     cin&gt;&gt;Ar[Rear].Pid;     cout&lt;&lt; "Enter Player Name=";     gets(Ar[Rear].Pname); } </pre>	
	<p style="text-align: center;"><b>OR</b></p> <pre> struct Book { int BNo; char BName[20]; Book *Next; }*temp,*top;  void pop() { temp=new Book ; temp=top; top=top-&gt;next; delete temp; } </pre>	
	<p>(1 Mark for checking if Queue is Full)  (1 Mark for checking if Queue is Empty)  (½ Mark for checking Rear is at size-1)  (½ Mark for incrementing Rear)  (½ Mark for assigning Values to the Rear location of the Queue)</p>	

		<b>OR</b> ( 1 Mark for creating new node Book) ( 1 Mark for assigning top to temp) ( 1 Mark for top=top->next) ( 1 Mark for delete top)																																											
	(e)	Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. $A/B+C*(D-E)$	(2)																																										
		<b>OR</b> Evaluate the following Postfix expression : 4,10,5,+,* ,15,3,/-																																											
	Ans:																																												
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Element</th> <th style="text-align: left;">Stack</th> <th style="text-align: left;">Postfix</th> </tr> </thead> <tbody> <tr><td>A</td><td></td><td>A</td></tr> <tr><td>/</td><td>/</td><td>A</td></tr> <tr><td>B</td><td>/</td><td>AB</td></tr> <tr><td>+</td><td>+</td><td>AB/</td></tr> <tr><td>C</td><td>+</td><td>AB/C</td></tr> <tr><td>*</td><td>+*</td><td>AB/C</td></tr> <tr><td>(</td><td>+*(</td><td>AB/C</td></tr> <tr><td>D</td><td>+*(</td><td>AB/CD</td></tr> <tr><td>-</td><td>+*(-</td><td>AB/CD</td></tr> <tr><td>E</td><td>+*(-</td><td>AB/CDE</td></tr> <tr><td>)</td><td>+*</td><td>AB/CDE-</td></tr> <tr><td></td><td>+</td><td>AB/CDE-*</td></tr> <tr><td></td><td></td><td>AB/CDE-*+</td></tr> </tbody> </table>	Element	Stack	Postfix	A		A	/	/	A	B	/	AB	+	+	AB/	C	+	AB/C	*	+*	AB/C	(	+*(	AB/C	D	+*(	AB/CD	-	+*(-	AB/CD	E	+*(-	AB/CDE	)	+*	AB/CDE-		+	AB/CDE-*			AB/CDE-*+	
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		<b>55</b>																																											
		<i>(½ Mark for conversion upto each operator illustrating through stack)</i>																																											
		<b>OR</b>																																											
		<i>(1/2 Mark for evaluating each operator)</i>																																											
4	(a)	Write a function RevText() to read a text file “ Input.txt “ and Print only word starting with ‘I’ in reverse order . <b>Example: If value in text file is: INDIA IS MY COUNTRY Output will be: AIDNI SI MY COUNTRY</b>	(2)																																										
		<b>OR</b>																																											
		Write a function in C++ to count the number of lowercase alphabets present in a text file “BOOK..txt”.																																											

	<p>Ans.</p> <pre> void RevText( ) {     ifstream Fin("Input.txt");     char Word[20];     while(!Fin.eof())     {         Fin&gt;&gt;Word;         if(Word[0]==‘I’)             strrev(Word);         cout&lt;&lt;Word&lt;&lt;“ ”;     }     Fin.close(); } </pre> <hr/> <p style="text-align: center;"><b>OR</b></p> <pre> int Countalpha() ifstream ifile ("BOOK.txt"); char ch; int count =0; while (! ifile.eof()) {     ifile.get(ch);     if(islower(ch))     count++; } ifile.close(); return (count) } </pre> <hr/> <p>(½ Mark for opening Input.txt correctly)  (½ Mark for reading each Word from the file)  (½ Mark for checking the word starting with ‘I’ )  (½ Mark for reversing and displaying the word)</p> <hr/> <p style="text-align: center;"><b>OR</b></p> <p>(½ Mark for opening Input.txt correctly)  (½ Mark for reading each character from the file)  (½ Mark for checking the lower character )  (½ Mark for displaying the count)</p>	
(b)	Write a function in C++ to search and display details, whose destination is “Cochin” from binary file “Bus.Dat”. Assuming the binary file is containing the objects of the following class:	(3)

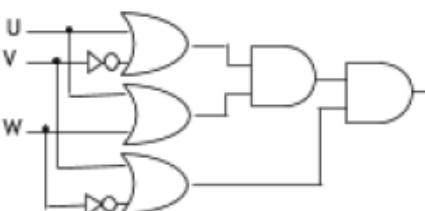
	<pre>         char To[20];           // Bus Destination         public: char * StartFrom ( ) { return From; } char * EndTo( ); { return To; } void input() { cin&gt;&gt;Bno&gt;&gt;; gets(From); get(To); } void show( ) { cout&lt;&lt;Bno&lt;&lt;“.”&lt;&lt;From &lt;&lt;“.” &lt;&lt;To&lt;&lt;endl; } };</pre>	
	<p style="text-align: center;"><b>OR</b></p> <p>Write a function in C++ to add more new objects at the bottom of a binary file "STUDENT.dat", assuming the binary file is containing the objects of the following class :</p> <pre> class STU { int Rno; char Sname[20]; public: void Enter() { cin&gt;&gt;Rno;gets(Sname); } void show() { cout &lt;&lt; Rno&lt;&lt;sname&lt;&lt;endl; } };</pre>	
Ans.	<pre> void Read_File( ) {     BUS B;     ifstream Fin;     Fin.open("Bus.Dat", ios::binary);     while(Fin.read((char *) &amp;B, sizeof(B)))     {         if(strcmp(B.EndTo(), "Cochin")==0)         {             B.show();         }     }     Fin.close(); }</pre>	<p style="text-align: center;"><b>OR</b></p>
	<pre> void Addrecord() { ofstream ofile; ofile.open("STUDENT.dat", ios ::out); STU S; char ch='Y'; while (Ch=='Y'    Ch == 'y') {</pre>	

	<pre> S.Enter(); ofile.write (Char*) &amp; S, sizeof(s)); cout &lt;&lt; "more (Y/N)"; cin&gt;&gt;ch; } ofile.close(); } </pre>	
	<p>(½ Mark for opening Bus.Dat correctly)  (1 Mark for reading each record from Bus.Dat)  (1 Mark for comparing value returned by EndTo( ) with “Cochin”)  (½ Mark for displaying the matching record)</p> <p style="text-align: center;"><b>OR</b></p> <p>(1 Mark for opening STUDENT.Dat correctly)  (1 Mark for S.Enter())  (1 Mark for writing each record into the file)</p>	
(c)	<p>Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 500 products.</p> <pre> class PRODUCT {     int PCode;char PName[20]; public:     void Entry();void Disp(); }; void main() {     fstream In;     In.open("PRODUCT.DAT",ios::binary ios::in);     PRODUCT P;     In.seekg(0,ios::end);     cout&lt;&lt;"Total Count: "&lt;&lt;In.tellg()/sizeof(P)&lt;&lt;endl;     In.seekg(70*sizeof(P));     In.read((char*)&amp;P, sizeof(P));     In.read((char*)&amp;P, sizeof(P));     cout&lt;&lt;"At Product:"&lt;&lt;In.tellg()/sizeof(P) + 1;     In.close(); } </pre> <p style="text-align: center;"><b>OR</b></p> <p>Which file stream is required for seekg() ?</p>	(1)
	Ans.	Total Count:500 At Product: 73
		<b>OR</b>

		<p>fstream/ ifstream</p> <p>(½ Mark for each correct value of In.tellg()/sizeof(P) as 500 and 73 respectively)</p> <p style="text-align: center;"><b>OR</b></p> <p>(1 Mark for correct stream)</p>																																				
5	(a)	<p>Observe the following table and answer the parts(i) and(ii) accordingly</p> <p><b>Table:Product</b></p> <table border="1"> <thead> <tr> <th>Pno</th><th>Name</th><th>Qty</th><th>PurchaseDate</th></tr> </thead> <tbody> <tr> <td>101</td><td>Pen</td><td>102</td><td>12-12-2011</td></tr> <tr> <td>102</td><td>Pencil</td><td>201</td><td>21-02-2013</td></tr> <tr> <td>103</td><td>Eraser</td><td>90</td><td>09-08-2010</td></tr> <tr> <td>109</td><td>Sharpener</td><td>90</td><td>31-08-2012</td></tr> <tr> <td>113</td><td>Clips</td><td>900</td><td>12-12-2011</td></tr> </tbody> </table> <p>(i) Write the names of most appropriate columns, which can be considered as candidate keys.</p> <p>Ans. Candidate Key: Pno, Name (1 Mark for writing correct Candidate Keys)</p> <p>(ii) What is the degree and cardinality of the above table?</p> <p>Ans. Degree:4 Cardinality:5 (½ Mark for writing correct value of degree) (½ Mark for writing correct value of cardinality)</p> <p>(b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables.</p>	Pno	Name	Qty	PurchaseDate	101	Pen	102	12-12-2011	102	Pencil	201	21-02-2013	103	Eraser	90	09-08-2010	109	Sharpener	90	31-08-2012	113	Clips	900	12-12-2011	(2)											
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(i)	Display the Trainer Name, City & Salary in descending order of their Hiredate.																																			
Ans.	<pre>SELECT TNAME, CITY, SALARY FROM TRAINER ORDER BY HIREDATE;</pre> <p>(½ Mark for SELECT TNAME, CITY, SALARY FROM TRAINER)  (½ Mark for ORDER BY HIREDATE)</p>																																			
(ii)	To display the TNAME and CITY of Trainer who joined the Institute in the month of December 2001.																																			
Ans.	<pre>SELECT TNAME, CITY FROM TRAINER WHERE HIREDATE BETWEEN '2001-12-01' AND '2001-12-31';</pre> <p>OR</p> <pre>SELECT TNAME, CITY FROM TRAINER WHERE HIREDATE &gt;= '2001-12-01' AND HIREDATE&lt;='2001-12-31';</pre> <p>OR</p> <pre>SELECT TNAME, CITY FROM TRAINER WHERE HIREDATE LIKE '2001-12%';</pre> <p>(½ Mark for SELECT TNAME, CITY FROM TRAINER)  (½ Mark for  WHERE HIREDATE BETWEEN '2001-12-01' AND '2001-12-31'  OR  WHERE HIREDATE &gt;= '2001-12-01' AND HIREDATE&lt;='2001-12-31'  OR  WHERE HIREDATE LIKE '2001-12%'</p>																																			
(iii)	To display TNAME, HIREDATE, CNAME, STARTDATE from tables TRAINER and COURSE of all those courses whose FEES is less than or equal to 10000.																																			
Ans.	<pre>SELECT TNAME,HIREDATE,CNAME,STARTDATE FROM TRAINER, COURSE WHERE TRAINER.TID=COURSE.TID AND FEES&lt;=10000;</pre>																																			

	(1 Mark for correct query) OR (½ Mark for correct SELECT ) (½ Mark for correct WHERE Clause)
(iv)	To display number of Trainers from each city.
Ans.	SELECT CITY, COUNT(*) FROM TRAINER GROUP BY CITY;  (1 Mark for correct query) OR (½ Mark for correct SELECT ) (½ Mark for GROUP BY CITY)
(v)	SELECT TID, TNAME, FROM TRAINER WHERE CITY NOT IN('DELHI', 'MUMBAI');
Ans.	<u>TIDTNAME</u> 103 DEEPTI 106 MANIPRABHA  (½ Mark for correct output)
(vi)	SELECT DISTINCT TID FROM COURSE;
Ans.	<u>DISTINCT TID</u> 101 103 102 104 105  (½ Mark for correct output)
(vii)	SELECT TID, COUNT(*), MIN(FEES) FROM COURSE GROUP BY TID HAVING COUNT(*)>1;
Ans.	<u>TIDCOUNT(*)MIN(FEES)</u> 101 2 12000  (½ Mark for correct output)
(viii)	SELECT COUNT(*), SUM(FEES) FROM COURSE WHERE STARTDATE< '2018-09-15';
Ans.	<u>COUNT(*)SUM(FEES)</u> 4 65000  (½ Mark for correct output)

6	<p>(a) State any one Distributive Law of Boolean Algebra and Verify it using truth table.</p>	(2)																																																																								
	<p>Ans. Distributive Law:  <math>A+BC = (A+B)(A+C)</math>  Verification</p>																																																																									
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	<p>(1 Mark for stating any one Distributive Law correctly)  (1 Mark for correctly verifying the stated Law using Truth Table)</p>																																																																									
	<p>(b) Draw the Logic Circuit of the following Boolean Expression:  <math>((U + V')(U + W')).(V + W')</math></p>	(2)																																																																								
	<p>Ans.</p> 																																																																									
	<p>(c) Derive a Canonical SOP expression for a Boolean function F(X,Y,Z) represented by the following truth table:</p>	(1)																																																																								

X	Y	Z	F(X,Y,Z)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans.  $F(X,Y,Z) = X'Y'Z' + X'Y'Z + XY'Z' + XYZ$

OR

$F(X,Y,Z) = \sum(0,1,4,7)$

(1 Mark for the correct SOP form)

OR

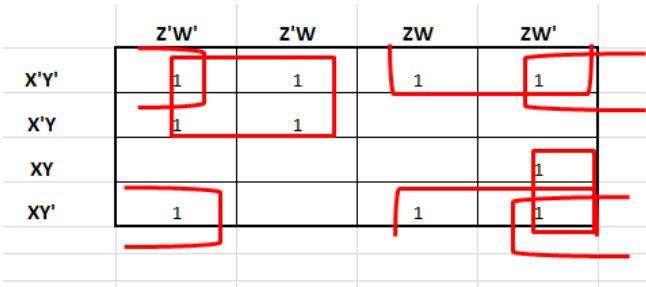
(½ Mark for writing any two term correctly)

(d)

Reduce the following Boolean Expression to its simplest form using K-Map:

$F(X,Y,Z,W) = \Sigma (0,1,2,3,4,5,8,10,11,14)$

(3)



**Simplified Expression:  $X'Z' + Y'W' + Y'Z + XZW'$**

(½ Mark for drawing K-Map and correctly plotting 1s in the given cells)

(½ Mark each for 4 groupings)

(½ Mark for writing final expression in reduced/minimal form)

Note:

- Deduct ½ mark if wrong variable names are used

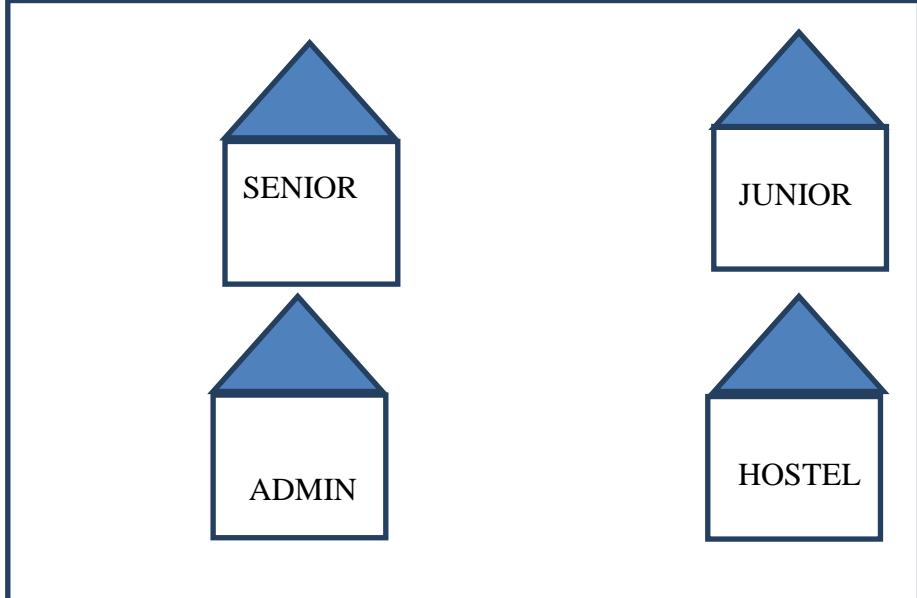
7

(a)

Arun opened his e-mail and found that his inbox was full of hundreds of unwanted mails. It took him around two hours to delete these unwanted mails and find the relevant ones in his inbox. What may be the cause of his receiving so many unsolicited mails? What can Arun do to prevent this happening in future?

(2)

Ans.	<p>Arun's email has been attacked with spam.      These may be promotional mails from different advertisement groups.      Arun must have checked some promotional offers while surfing the Internet.      He should create filters in his email to stop receiving these unwanted mails.</p>	
	<p>(1 Mark for writing correct Answer)  (1 Mark for writing correct Justification to prevent Spam)</p>	
(b)	<p>Assume that 50 employees are working in an organization. Each employee has been allotted a separate workstation to work. In this way, all computers are connected through the server and all these workstations are distributed over two floors. In each floor, all the computers are connected to a switch. Identify the type of network?</p>	(1)
Ans.	<p>LAN(Local Area Network)</p>	
	<p>(1 Mark for writing correct Answer)</p>	
(c)	<p>Your friend wishes to install a wireless network in his office. Explain him the difference between guided and unguided media.</p>	(1)
Ans.	<p>Guided media uses cables to connect computers, whereas unguided media uses waves.</p>	
	<p>(1 Mark for writing any correct difference between guided and unguided media)</p>	
(d)	<p>Write the expanded names for the following abbreviated terms used in Networkingand Communications:</p> <p>(i) CDMA    (ii) HTTP    (iii) XML    (iv) URL</p>	(2)
Ans.	<p>(i) Code Division Multiple Access  (ii) Hyper Text Transfer Protocol  (iii) Extensible Markup Language  (iv) Uniform Resource Locator</p>	
	<p>( ½ Mark for writing each correct expansion)</p>	
(e)	<p>Multipurpose Public School, Bangluru is Setting up the network between its Different Wings of school campus. There are 4 wings   namedasSENIOR(S),JUNIOR(J),ADMIN(A)andHOSTEL(H).   Multipurpose Public School, Bangluru</p>	(4)



Distance between various wings are given below:

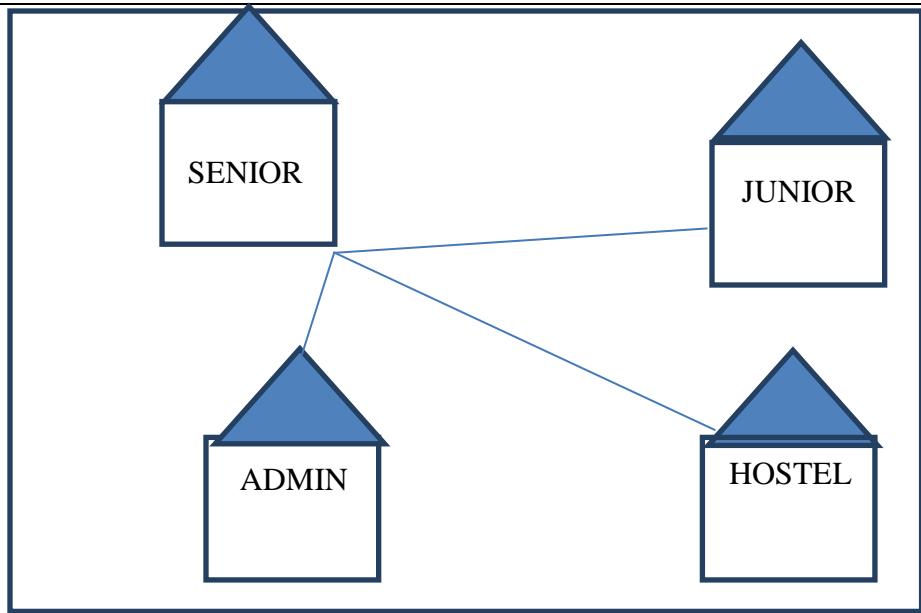
WingAtoWingS	100m
WingAtoWingJ	200m
WingAtoWingH	400m
WingStoWingJ	300m
WingStoWingH	100m
WingJtoWingH	450m

Number of Computers installed at various wings are as follows:

Wings	NumberofComputers
WingA	20
WingS	150
WingJ	50
WingH	25

- (i) Suggest the best wired medium and draw the cable layout to efficiently connect various wings of Multipurpose PublicSchool, Bangluru.

Ans Best wired medium: Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable



(½ Mark for writing best wired medium)

(½ Mark for drawing the layout correctly)

- (ii) Name the most suitable wing where the Server should be installed. Justify your answer.

Ans. Wing Senior(S)- Because it has maximum number of computers.

(½ Mark for correct Wing)

(½ Mark for valid justification)

- (iii) Suggest a device/software and its placement that would provide data security for the entire network of the School.

Ans. Firewall - Placed with the server at Senior  
OR

Any other valid device/software name

(½ Mark for writing device/software name correctly)

(½ Mark for writing correct placement)

- (iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the campus of Multipurpose Public School, Bangluru.

Ans. Device Name: WiFi Router OR WiMax OR RF Router OR Wireless Modem OR RFTransmitter  
Protocol : WAP OR 802.16 OR TCP/IP OR VOIP OR MACP OR 802.11

(½ Mark for writing correct device name)

(½ Mark for writing correct protocol)

**SAMPLE QUESTION PAPER****Subject: Computer Science****Class: XII (2017-18)**

Time: 3 Hrs.

M.M.:70

Instructions:

(a) All questions are compulsory,

(b) Answer either Section A or Section B:

(i) Section A - Programming Language with C++

(ii) Section B - Programming Language with Python

(c) Section C is compulsory.

**SECTION – A (C++)**

Q. No.	Part	Question Description	Marks
Q1.	(a)	What is the role of a parameter/argument passed in a function? Can a default value be assigned to a parameter(Yes/No)? If yes, justify your answer with the help of a suitable example otherwise give reason.	2
	(b)	<p>Raman suggests Kishan the following header files which are required to be included in the given C++ program. Identify the header files which are wrongly suggested by Raman.</p> <p>Program:</p> <pre>void main() {     char Grade;     cin.get(Grade);     if(isalpha(Grade))         cout.put(Grade); }</pre> <p>Suggested header files:-</p> <ol style="list-style-type: none"> <li>1. iostream.h</li> <li>2. stdio.h</li> <li>3. conio.h</li> <li>4. ctype.h</li> </ol>	1
	(c)	Rewrite the following program after removing the syntactical errors (if any). Underline each correction.	2

	<pre> Typdef int Num; Num full=100; Num Calc(int X) {     full=(X&gt;2)?1:2;     return (full%2) } void main {     int full=1000;     full=Calc(::full);     cout&lt;&lt;::full&lt;&lt;"::"&gt;&gt;full&gt;&gt;endl; } </pre>	
(d)	<p>Write the output of the following C++ program code(assume all necessary header files are included in program):</p> <pre> void Encrypt(char *S, int key) {     char *Temp=S;     if(key%2==0)     {         key--;     }     while(*Temp!='\0')     {         *Temp+=key;         Temp+= key;     } } void main() {     int Key_Set[]={1,2,3};     char Pvt_Msg[]="Computer2017";     for(int C=0;C&lt;2;C++)     {         Encrypt(Pvt_Msg, Key_Set[C]);         cout&lt;&lt;"New Encrypted Message after Pass "&lt;&lt;C+1&lt;&lt;" is :"&lt;&lt;Pvt_Msg;         cout&lt;&lt;endl;     } } </pre>	2
(e)	<p>Write the output of the following C++ program code(assume all necessary header files are included in program):</p>	3

```

struct Ticket
{
    char Level;
    int Price;
};
void Compute(Ticket &T)
{
    if (T.Level=='A')
        T.Price+=50;
    else if (T.Level=='B')
        T.Price+=30;
    else if (T.Level=='C')
        T.Price+=25;
    cout<<T.Level<<":"<<T.Price<<endl;
}
void main()
{
    Ticket Mon_Show[ ]={{'C',250},{'A',300},{'B',350}};
    for(int count=2;count>=0; )
    {
        Compute(Mon_Show[count--]);
    }
}

```

	(f)	<p>Consider the following C++ program code and choose the option(s) which are <b>not</b> possible as output. Also, print the <b>minimum &amp; maximum</b> value of variable <b>Pick</b> during complete execution of the program.(assume all necessary header files are included in program):</p> <pre> const int NUM=5; void main() {     randomize();     int V1=1, V2=5, Pick;     while(V1&lt;V2)     {         Pick = random(NUM) + (V2-V1);         cout&lt;&lt;Pick&lt;&lt;":";         V1++;     } } </pre> <p>(a) 5:6:6:6:  (b) 4:7:5:3:  (c) 8:6:1:2:  (d) 7:5:3:1</p>	2
Q2.	(a)	What do you mean by Data Abstraction in OOPs? Explain its significance in programming with a suitable example.	2
	(b)	Answer the question (i) & (ii) after going through the following code. (assume all necessary header files are included in program):-	2

```

class Game
{
    char Name[21];
    int No_of_Players;
public:
    Game()           //Function 1
    {
        strcpy(Name,"Cricket");
        No_of_Players=11;
        cout<<"New Game Starts\n";
    }
    Game(char N[],int No)      //Function 2
    {
        strcpy(Name,N);
        No_of_Players=No;
        cout<<Name<<"comprises"<<No_of_Players<<" number of players\n";
    }
    ~Game()           //Function 3
    {
        cout<<"Game Ends\n";
    }
};

```

- (i) Give the name of the feature of OOP which is implemented by Function 1 & 2 together in the above class Game.
- (ii) Anuj made changes to the above class Game and made Function 3 private. Will he be able to execute the Line 1 successfully given below? Justify.

```

void main()
{
    Game ABC;      //Line 1
}

```

(c) Define a class Bill in OOP with the following specification:-

**Private members:**

1. Bill\_no - type long(bill number)
2. Bill\_period - type integer(number of months)
3. No\_of\_calls - type integer(number of mobile calls)
4. Payment\_mode - type string("online" or "offline")
5. Amount - type float(amount of bill)
6. Calculate\_Bill() function to calculate the amount of bill given as per the following conditions:

No_of_calls	Calculation Rate/call (in rupees)
<=500	1.0
501-1200	2.0
>1200	4.0

	<p>Also, the value of Amount should be reduced by 5% if Payment_mode is “online”.</p> <p><b><u>Public members:</u></b></p> <ol style="list-style-type: none"> <li>1. A member function New_Bill() that will accept the values for Bill_no, Bill_period, No_of_calls, Payment_mode from the user and invoke Caluclate_Bill() to assign the value of Amount.</li> <li>2. A member function Print_Bill() that will display all details of a Bill.</li> </ol>	
(d)	<p>Answer the question from (i) to (iv) based on the given below code(assume all necessary header files are included in program):-</p> <pre> class City {     int City_Id;     char City_Name[30]; protected:     int City_Population; public:     City();     void Get_Population();     void New_City();     void Show_City(); };  class State : public City {     int State_Id;     char State_Name[25]; protected:     int State_Population; public:     State();     void New_State();     void Print_State(); };  class Country : private State {     int Country_Id;     char Country_Name[25]; public:     Country();     void New_Country();     void Display_Country(); }; </pre> <p>(i) Write name of the class whose constructor is invoked first on the creation of a new object of class Country.</p> <p>(ii) Write name of the data members which are accessible through the object of class Country.</p>	4

		<p>(iii) List name of the members which are accessible through the member function “void New_Country()”.</p> <p>(iv) What will be the size(in bytes) of an object of class Country &amp; State respectively.</p>	
Q3	(a)	<p>Write the definition of function named <b>Array_Swap()</b> that will accept an integer array &amp; its size as arguments and the function will interchange/swap elements in such a way that the first element is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd.</p> <p>E.g. if initially array of seven elements is:</p> <p style="text-align: center;"><b>5, 16, 4, 7, 19, 8, 2</b></p> <p>After execution of the above function, the contents of the array will be:</p> <p style="text-align: center;"><b>2,16, 19, 7, 4, 8, 5</b></p>	3
	(b)	An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base address of the array and the memory address of element stored at location A[30][25]?	3
	(c)	<p>Write the definition of a member function <b>Q_Insert()</b> for a class <b>Exam_Queue</b> in C++ to insert a new <b>Application</b> information in a dynamically allocated queue whose code is already given below as a part of the program(assume all necessary header files are included in program):</p> <pre> <b>struct Application</b> {     int App_Id;     char App_Name[21];     Application *Link; };  <b>class Exam_Queue</b> {     Application *Front, *Rear; public:     Exam_Queue() //Constructor     {         Front=Rear=NULL;     }     void Q_Insert ();     void Q_Delete(); }; </pre>	4
	(d)	<p>Write the definition of a user-defined function <b>REPEAT_ROW(int A[][3],int R, int C)</b> in C++ that will store the elements in the following manner</p> <ol style="list-style-type: none"> <li>1. All row elements except the 1<sup>st</sup> element replaced by the 1<sup>st</sup> element,</li> <li>2. All row elements except the 1<sup>st</sup> &amp; 2<sup>nd</sup> element replaced by the 2<sup>nd</sup> element,</li> <li>3. All row elements except the 1<sup>st</sup>, 2<sup>nd</sup> &amp; 3<sup>rd</sup> element replaced by the 3<sup>rd</sup> element and</li> </ol>	2

	<p>so on.</p> <p>For example: if initially the array was:-</p> <table border="1"> <tbody> <tr><td>5</td><td>6</td><td>10</td><td>2</td></tr> <tr><td>2</td><td>6</td><td>9</td><td>12</td></tr> <tr><td>18</td><td>14</td><td>5</td><td>6</td></tr> </tbody> </table> <p>Then, the contents of the array after execution of the above function will be:-</p> <table border="1"> <tbody> <tr><td>5</td><td>5</td><td>5</td><td>5</td></tr> <tr><td>2</td><td>6</td><td>6</td><td>6</td></tr> <tr><td>18</td><td>14</td><td>14</td><td>14</td></tr> </tbody> </table>	5	6	10	2	2	6	9	12	18	14	5	6	5	5	5	5	2	6	6	6	18	14	14	14	
5	6	10	2																							
2	6	9	12																							
18	14	5	6																							
5	5	5	5																							
2	6	6	6																							
18	14	14	14																							
	(e) Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately: <b>TRUE, FALSE, OR, NOT, TRUE, FALSE, AND, OR</b>	2																								
Q4.	<p>(a) Answer the questions (i) &amp; (ii) in the program segment given below for the required task.</p> <pre>class Route {     int Route_No;                                //Route Number     char Route_Name[21];                          //Name of Route     int No_Kms;                                  //Distance in kms on Route public:     void New_Route();                            //Accepts details of new Route     void Show_Route();                           //Display details of a Route     int Get_RouteNo()                           //Return the Route Number     {         return Route_No;     }     void Update_Kms(int K)     {         No_Kms=K;     } };  void Update_Route(int No, int New_Kms)          //Update No_Kms of a Route {     Route R;     fstream File("ROUTE.DAT",ios::in   ios::out   ios::binary);     while(!File.eof())     {         File.read((char*)&amp;R, sizeof(R));         if( (R.Get_RouteNo()==No))         {             R.Update_Kms(New_Kms);             _____             _____             cout&lt;&lt;"Route Details updated\n";         }     }     File.close(); }  (i) Write Statement 1 to position the file pointer to the appropriate place so that the data updation is done for the correct Route.  (ii) Write Statement 2 to perform the write operation so that the updation is done</pre>	1																								

		in the binary file “ROUTE.DAT”.	
	(b)	<p>Write a user-defined function named <b>Count()</b> that will read the contents of text file named “<b>Report.txt</b>” and count the number of lines which starts with either ‘I’ or ‘M’. E.g. In the following paragraph, there are 2 lines starting with ‘I’ or ‘M’:</p> <p><b><i>India is the fastest growing economy.</i></b></p> <p><b><i>India is looking for more investments around the globe.</i></b></p> <p><b><i>The whole world is looking at India as a great market.</i></b></p> <p><b><i>Most of the Indians can foresee the heights that India is capable of reaching.”</i></b></p>	2
	(c)	<p>Consider the following class Item:-</p> <pre>class Item {     int ItemId;     int Quantity;     float Price; public:     void NewItem()     {         cin&gt;&gt;ItemId&gt;&gt;Quantity&gt;&gt;Price;     }     void ShowItem()     {         cout&lt;&lt;ItemId&lt;&lt;":"&lt;&lt;Quantity&lt;&lt;":"&lt;&lt;Price&lt;&lt;endl;     }     void Set_Price(float P)     {         Price=P;     }     int Ret_Id()     {         return ItemId;     } };</pre> <p>Write a function named <b>Change_Item(int Id, float Pr)</b> to modify the price of the item whose ItemId &amp; new price are passed as an argument.</p>	3

### SECTION – B (Python)

Q1	(a)	Differentiate between break and continue statement with the help of an example.	2
	(b)	Identify and write the name of the module to which the following functions belong: i. ceil()    ii. findall()	1
	(c)	Observe the following Python code very carefully and rewrite it after removing all syntactical errors with each correction underlined.	2
		<pre>DEF execmain():     x = input("Enter a number:")     if (abs(x) == x):         print"You entered a positive number"     else:         x=**-1         print" Number made positive:"x  execmain()</pre>	
	(d)	Write the output of the following Python code:	2

		<pre>i=5 j=7 x=0 i=i+(j-i) x=j+i print x,":",i j=j**2 x=j+i i=i+1 print i,":",j</pre>	
	(e)	<p>Write the output of the following Python program code:</p> <pre>Data =['D','o',' ','I','t',' ','@',' ','1','2','3',' ','!']  for i in range(len(Data)-1):      if (Data[i].isupper()):         Data[i]=Data[i].lower()     elif (Data[i].isspace()):         Data[i]=Data[i+1] print Data</pre>	3
	(f)	<p>Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable Y.</p> <pre>import random X= random.random() Y= random.randint(0,4) print int(X),":",Y+int(X)</pre> <p>i) 0 : 0 ii) 1 : 6 iii) 2 : 4 iv) 0 : 3</p>	2
Q2	(a)	Explain operator overloading with the help of an example.	2
	(b)	<p>Observe the following Python code and answer the questions (i) and (ii):</p> <pre>class BOOK :     count=0     def __init__(self): # Function 1         self.Author="Not assigned"         self.Publisher = "Not assigned"         self.ISBN = "Not assigned"     def display(self):         print self.Author,self.Publisher,self.ISBN     @staticmethod     def bookcount(): # Function 2         BOOK.count=BOOK.count+1         return BOOK.count</pre>	
	(i)	How is data member ‘count’ different from data member ‘Author’?	1
	(ii)	<p>Fill in the blanks: <b>B=BOOK()</b></p> <p style="text-align: right;">#Write statement to invoke Function 2</p>	1

**#Write statement to invoke Function 3**

(c)	<p>Define a class COURSE in Python with the following description :</p> <p><b>Instance Attributes:</b></p> <ul style="list-style-type: none"> <li>REGNO Integer</li> <li>CNAME String</li> <li>Score Float</li> <li>Fees Float</li> </ul> <p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>• A constructor to assign REGNO as 0, Score and Fees as 0.0</li> <li>• SetCourse() to assign Course and Fees on the basis of the Score input as per the following criteria:</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Score</th> <th>CNAME</th> <th>Fees</th> </tr> </thead> <tbody> <tr> <td><math>\geq 9.0 - \leq 10.0</math></td> <td>Clinical Psychology</td> <td>10000.0</td> </tr> <tr> <td><math>\geq 8.0 - &lt; 9.0</math></td> <td>Corporate Counselling</td> <td>8000.0</td> </tr> <tr> <td><math>\geq 5.0 - &lt; 8.0</math></td> <td>Guidance and Counselling</td> <td>6000.0</td> </tr> <tr> <td>less than 5.0</td> <td>Not Eligible</td> <td>0.0</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• GETDATA() to input REGNO and Score and invoke SetCourse()</li> <li>• DISPLAY() to display all the details.</li> </ul>	Score	CNAME	Fees	$\geq 9.0 - \leq 10.0$	Clinical Psychology	10000.0	$\geq 8.0 - < 9.0$	Corporate Counselling	8000.0	$\geq 5.0 - < 8.0$	Guidance and Counselling	6000.0	less than 5.0	Not Eligible	0.0	4
Score	CNAME	Fees															
$\geq 9.0 - \leq 10.0$	Clinical Psychology	10000.0															
$\geq 8.0 - < 9.0$	Corporate Counselling	8000.0															
$\geq 5.0 - < 8.0$	Guidance and Counselling	6000.0															
less than 5.0	Not Eligible	0.0															
(d)	<p>Answer the questions (i) and (ii) based on the following:</p> <pre> class Vehicle(object):     def __init__(self,l=0,w=0):         self.length=l         self.width=w     def define(self):         print "Vehicle with length", self.length,"in &amp; width",self.width,"in" class Car(Vehicle):     def __init__(self,clr,seats,l,w):         Vehicle.__init__(self,l,w) #Line 3         self.colour=clr         self.seatingCapacity=seats     def changeGears(self,gr):         print "changed to gear",gr     def turn(self,direction):         print "turned to",direction,"direction" class RacingCar(Car):     def __init__(self,clr,seats,l,w,tr,spd): # Line 1         Car.__init__(self,clr,seats,l,w) #Line 2         self.turnRadius=tr         self.speed=spd      def start(self):         self.define()         self.changeGears(2)         print "Racing car starts-ready to vroom!"</pre>	4															
(i)	Explain the relationship between Line 1 , Line 2 and Line 3.																
(ii)	Predict the output that will be produced on the execution of the following statements : <pre>rcar=RacingCar('Blue',2,206,78.5,6,200) rcar.start() rcar.turn("left")</pre>																

Q3	(a)	<p>Write the definition of a function Reverse(X) in Python, to display the elements in reverse order such that each displayed element is the twice of the original element (element * 2) of the List X in the following manner:</p> <p>Example: If List X contains 7 integers is as follows:</p> <table border="1"> <thead> <tr> <th>X[0]</th><th>X[1]</th><th>X[2]</th><th>X[3]</th><th>X[4]</th><th>X[5]</th><th>X[6]</th></tr> </thead> <tbody> <tr> <td>4</td><td>8</td><td>7</td><td>5</td><td>6</td><td>2</td><td>10</td></tr> </tbody> </table> <p>After executing the function, the array content should be displayed as follows:</p> <table> <tr> <td>20</td><td>4</td><td>12</td><td>10</td><td>14</td><td>16</td><td>8</td></tr> </table>	X[0]	X[1]	X[2]	X[3]	X[4]	X[5]	X[6]	4	8	7	5	6	2	10	20	4	12	10	14	16	8	2
X[0]	X[1]	X[2]	X[3]	X[4]	X[5]	X[6]																		
4	8	7	5	6	2	10																		
20	4	12	10	14	16	8																		
(b)	<p>Consider the following unsorted list :</p> <p>[22, 54, 12, 90, 55, 78]</p> <p>Write the passes of selection sort for sorting the list in ascending order till the 3<sup>rd</sup> iteration.</p>	3																						
	(c)	<p>Consider the following class Order and do as directed:</p> <pre>class ORDER:     L=[]     def __init__(self):         self.OID = 0     def insertorder(self):         self.OID = input("Enter Order Id")     def _____: _____ → Blank 1     def delorder(self):         :         :</pre> <p>i. Fill in the blank 1 with a statement to insert OID in the Queue maintained using List L.</p> <p>ii. Complete the definition of delorder() to delete OID from the Queue maintained using List L, the function should return the OID being deleted or -1 in case the Queue is empty.</p>	4																					
	d)	Write a generator function to generate odd numbers between a and b(including b).Note: a and b are received as an argument by the function.	3																					
	(e)	Evaluate the following postfix expression using a stack. Show the contents of stack after execution of each operation: 10,40,25,-,* ,15,4,* ,+	2																					
Q4.	(a)	Nancy intends to position the file pointer to the beginning of a text file. Write Python statement for the same assuming F is the File object.	1																					
	(b)	<p>Write a function <b>countmy( )</b> in Python to read the text file “DATA.TXT” and count the number of times “my” occurs in the file.</p> <p>For example if the file “DATA.TXT” contains:</p> <p>“This is my website. I have displayed my preferences in the CHOICE section.”</p> <p>The <b>countmy( )</b> function should display the output as:</p> <p>“my occurs 2 times”.</p>	2																					
	(c)	Write a function in python to search and display details of all those students, whose stream is “HUMANITIES” from pickled file “Student.dat”. Assuming the pickled file is containing the objects of the following class:	3																					

```

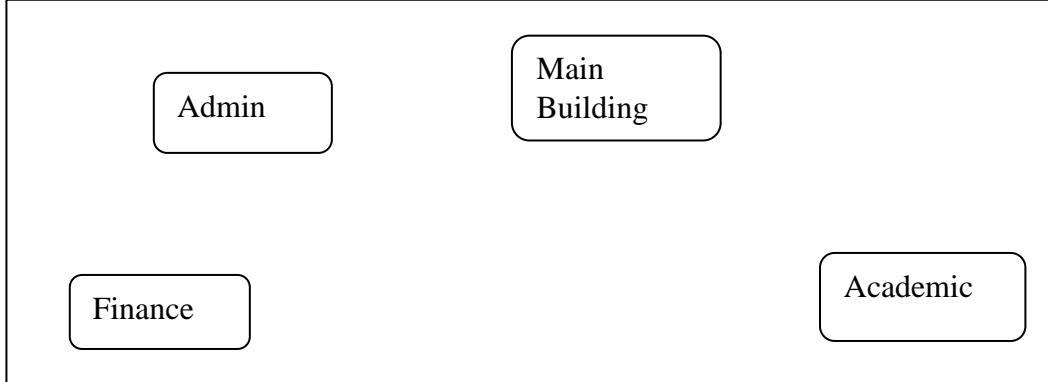
class STUDENT:
    def __init__(self):
        self.RNO = 0
        self.NAME = " "
        self.STREAM = " "
        self.PERCENT = 0.0
    def ACCEPT(self):
        self.RNO = input("Enter Roll no")
        self.NAME = raw_input("Enter Name")
        self.STREAM = raw_input("Enter Stream")
        self.PERCENT = input("Enter percentage")
    def DISPLAY(self):
        print self.RNO, self.NAME, self.STREAM, self.PERCENT
    def RET_STREAM(self):
        return(self.STREAM)

```

### SECTION – C

Q5	(a)	Differentiate between DDL & DML. Identify DDL & DML commands from the following:-  (UPDATE, SELECT, ALTER, DROP)	2																																																										
	(b)	<p>Consider the following relation MobileMaster &amp; MobileStock:-</p> <p style="text-align: center;"><b><u>MobileMaster</u></b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">M_Id</th> <th style="text-align: center; padding: 5px;">M_Company</th> <th style="text-align: center; padding: 5px;">M_Name</th> <th style="text-align: center; padding: 5px;">M_Price</th> <th style="text-align: center; padding: 5px;">M_Mf_Date</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">MB001</td><td style="text-align: center; padding: 5px;">Samsung</td><td style="text-align: center; padding: 5px;">Galaxy</td><td style="text-align: center; padding: 5px;">4500</td><td style="text-align: center; padding: 5px;">2013-02-12</td></tr> <tr> <td style="text-align: center; padding: 5px;">MB003</td><td style="text-align: center; padding: 5px;">Nokia</td><td style="text-align: center; padding: 5px;">N1100</td><td style="text-align: center; padding: 5px;">2250</td><td style="text-align: center; padding: 5px;">2011-04-15</td></tr> <tr> <td style="text-align: center; padding: 5px;">MB004</td><td style="text-align: center; padding: 5px;">Micromax</td><td style="text-align: center; padding: 5px;">Unite3</td><td style="text-align: center; padding: 5px;">4500</td><td style="text-align: center; padding: 5px;">2016-10-17</td></tr> <tr> <td style="text-align: center; padding: 5px;">MB005</td><td style="text-align: center; padding: 5px;">Sony</td><td style="text-align: center; padding: 5px;">XperiaM</td><td style="text-align: center; padding: 5px;">7500</td><td style="text-align: center; padding: 5px;">2017-11-20</td></tr> <tr> <td style="text-align: center; padding: 5px;">MB006</td><td style="text-align: center; padding: 5px;">Oppo</td><td style="text-align: center; padding: 5px;">SelfieEx</td><td style="text-align: center; padding: 5px;">8500</td><td style="text-align: center; padding: 5px;">2010-08-21</td></tr> </tbody> </table> <p style="text-align: center;"><b><u>MobileStock</u></b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">S_Id</th> <th style="text-align: center; padding: 5px;">M_Id</th> <th style="text-align: center; padding: 5px;">M_Qty</th> <th style="text-align: center; padding: 5px;">M_Supplier</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">S001</td><td style="text-align: center; padding: 5px;">MB004</td><td style="text-align: center; padding: 5px;">450</td><td style="text-align: center; padding: 5px;">New Vision</td></tr> <tr> <td style="text-align: center; padding: 5px;">S002</td><td style="text-align: center; padding: 5px;">MB003</td><td style="text-align: center; padding: 5px;">250</td><td style="text-align: center; padding: 5px;">Praveen Gallery</td></tr> <tr> <td style="text-align: center; padding: 5px;">S003</td><td style="text-align: center; padding: 5px;">MB001</td><td style="text-align: center; padding: 5px;">300</td><td style="text-align: center; padding: 5px;">Classic Mobile Store</td></tr> <tr> <td style="text-align: center; padding: 5px;">S004</td><td style="text-align: center; padding: 5px;">MB006</td><td style="text-align: center; padding: 5px;">150</td><td style="text-align: center; padding: 5px;">A-one Mobiles</td></tr> <tr> <td style="text-align: center; padding: 5px;">S005</td><td style="text-align: center; padding: 5px;">MB003</td><td style="text-align: center; padding: 5px;">150</td><td style="text-align: center; padding: 5px;">The Mobile</td></tr> <tr> <td style="text-align: center; padding: 5px;">S006</td><td style="text-align: center; padding: 5px;">MB006</td><td style="text-align: center; padding: 5px;">50</td><td style="text-align: center; padding: 5px;">Mobile Centre</td></tr> </tbody> </table> <p>Write the SQL query for questions from (i) to (iv) &amp; write the output of SQL command for questions from (v) to (viii) given below:-</p> <p>(i) Display the Mobile company, name &amp; price in descending order of their</p>	M_Id	M_Company	M_Name	M_Price	M_Mf_Date	MB001	Samsung	Galaxy	4500	2013-02-12	MB003	Nokia	N1100	2250	2011-04-15	MB004	Micromax	Unite3	4500	2016-10-17	MB005	Sony	XperiaM	7500	2017-11-20	MB006	Oppo	SelfieEx	8500	2010-08-21	S_Id	M_Id	M_Qty	M_Supplier	S001	MB004	450	New Vision	S002	MB003	250	Praveen Gallery	S003	MB001	300	Classic Mobile Store	S004	MB006	150	A-one Mobiles	S005	MB003	150	The Mobile	S006	MB006	50	Mobile Centre	6
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	<p>manufacturing date,</p> <p>(ii) List the details of mobile whose name starts with ‘S’ or ends with ‘a’,</p> <p>(iii) Display the Mobile supplier &amp; quantity of all mobiles except ‘MB003’,</p> <p>(iv) List showing the name of mobile company having price between 3000 &amp; 5000,</p> <p>(v) <code>SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;</code></p> <p>(vi) <code>SELECT MAX(M_Date), MIN(M_Date) FROM MobileMaster;</code></p> <p>(vii) <code>SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty&gt;=300;</code></p> <p>(viii) <code>SELECT AVG(M_Price) FROM MobileMaster;</code></p>																																					
Q6.	(a) State & prove De-Morgan’s law using truth table.	2																																				
	(b) Draw the equivalent logic circuit diagram of the following Boolean expression:- $(A' + B).C'$	2																																				
	(c) Write the SOP form for the Boolean Function $F(X,Y,Z)$ represented by the given truth table:- <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th><th>Y</th><th>Z</th><th>F</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	X	Y	Z	F	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	0	1	0	0	0	1	0	1	0	1	1	0	1	1	1	1	1	1
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	(d) Reduce the following Boolean expression using K-Map:- $F(U,V,W,Z)=\pi(0,2,5,7,12,13,15)$	3																																				
Q7.	(a) A teacher provides “ <a href="http://www.XtSchool.com/default.aspx">http://www.XtSchool.com/default.aspx</a> ” to his/her students to identify the URL & domain name.	1																																				
	(b) Which out of the following does <b>not</b> come under Cyber Crime? <ul style="list-style-type: none"> <li>(i) Copying data from the social networking account of a person without his/her information &amp; consent.</li> <li>(ii) Deleting some files, images, videos, etc. from a friend’s computer with his consent.</li> <li>(iii) Viewing &amp; transferring funds digitally from a person’s bank account without his/her knowledge.</li> <li>(iv) Intentionally making a false account on the name of a celebrity on a social</li> </ul>	1																																				

		networking site.																						
	(c)	Expand the following:- 1. GSM                    2. TDMA	1																					
	(d)	What is the significance of cookies stored on a computer?	1																					
	(e)	Kabir wants to purchase a Book online and he has placed the order for that book using an e-commerce website. Now, he is going to pay the amount for that book online using his Mobile, then he needs which of the following to complete the online transaction:- <ol style="list-style-type: none"><li>1. A bank account,</li><li>2. Mobile phone which is attached to above bank account,</li><li>3. The mobile banking app of the above bank installed on that mobile,</li><li>4. Login credentials(UID &amp; Pwd) provided by the bank,</li><li>5. Or all of above.</li></ol>	1																					
	(f)	What do you mean by data encryption? For what purpose it is used for?	1																					
	(g)	Sanskars University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office & web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions in the campus & other details which are given below:   <p>The diagram shows four rectangular boxes representing buildings, arranged in a rectangle. The top-left box is labeled 'Admin'. The top-right box is labeled 'Main Building'. The bottom-left box is labeled 'Finance'. The bottom-right box is labeled 'Academic'.</p> <p>The distances between various buildings of university are given as:-</p> <table border="1"> <thead> <tr> <th><b>Building 1</b></th> <th><b>Building 2</b></th> <th><b>Distance(in mtrs.)</b></th> </tr> </thead> <tbody> <tr> <td>Main</td> <td>Admin</td> <td>50</td> </tr> <tr> <td>Main</td> <td>Finance</td> <td>100</td> </tr> <tr> <td>Main</td> <td>Academic</td> <td>70</td> </tr> <tr> <td>Admin</td> <td>Finance</td> <td>50</td> </tr> <tr> <td>Finance</td> <td>Academic</td> <td>70</td> </tr> <tr> <td>Admin</td> <td>Academic</td> <td>60</td> </tr> </tbody> </table>	<b>Building 1</b>	<b>Building 2</b>	<b>Distance(in mtrs.)</b>	Main	Admin	50	Main	Finance	100	Main	Academic	70	Admin	Finance	50	Finance	Academic	70	Admin	Academic	60	
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	<p>Number of computers:-</p> <table border="1"> <thead> <tr> <th><b>Building</b></th><th><b>No. of Computers</b></th></tr> </thead> <tbody> <tr> <td>Main</td><td>150</td></tr> <tr> <td>Admin</td><td>75</td></tr> <tr> <td>Finance</td><td>50</td></tr> <tr> <td>Academic</td><td>60</td></tr> </tbody> </table> <p>As a network expert, you are required to give best possible solutions for the given queries of the university administration:-</p> <ul style="list-style-type: none"> <li>(a) Suggest cable layout for the connections between the various buildings, 1</li> <li>(b) Suggest the most suitable building to house the server of the network of the university, 1</li> <li>(c) Suggest the placement of following devices with justification:            1. Switch/Hub            2. Repeater 1</li> <li>(d) Suggest the technology out of the following for setting-up very fast Internet connectivity among buildings of the university            1. Optical Fibre            2. Coaxial cable            3. Ethernet Cable 1</li> </ul>	<b>Building</b>	<b>No. of Computers</b>	Main	150	Admin	75	Finance	50	Academic	60	
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**MARKING SCHEME**  
**Subject: Computer Science**  
**Class: XII (2017-18)**

Time: 3 Hrs.		M.M.:70
<b>Instructions:</b>		
(a) All questions are compulsory, (b) Answer either Section A or Section B: (i) Section A - Programming Language with C++ (ii) Section B - Programming Language with Python (c) Section C is compulsory.		
SECTION – A (C++)		
Q. No.	Part	Question Description
Q1.	(a)	<p>What is the role of a parameter/argument passed in a function? Can a default value be assigned to a parameter(Yes/No)? If yes, justify your answer with the help of a suitable example otherwise give reason.</p>
	Ans	<p>Parameters/arguments are values passed in the function for the attributes which are required by the function to work and provide desired output.</p> <p>Yes, an argument may be assigned a default value.</p> <p>E.g.</p> <pre>int Sum(int a, int b=10)           //Here b is given a default value of 10 {     return (a+b); }  void main() {     int x=5;     cout&lt;&lt;Sum(x); }</pre> <p>Output: 15</p> <p><b>(1 mark for correct role of parameter)</b>  <b>(1/2 mark for correct answer)</b>  <b>(1/2 mark for giving correct example)</b></p>
	(b)	Raman suggests Kishan the following header files which are required to be included in

	<p>the given C++ program. Identify the header files which are <b>wrongly</b> suggested by Raman.</p> <p><b>Program:</b></p> <pre>void main() {     char Grade;     cin.get(Grade);     if(isalpha(Grade))         cout.put(Grade); }</pre> <p><u>Suggested header files:-</u></p> <ol style="list-style-type: none"> <li>1. iostream.h</li> <li>2. stdio.h</li> <li>3. conio.h</li> <li>4. ctype.h</li> </ol>	
Ans	<p>stdio.h conio.h</p> <p><b>(1/2 mark for each correct header file)</b></p>	
(c)	<p>Rewrite the following program after removing the syntactical errors (if any). Underline each correction.</p> <pre>#include&lt;iostream.h&gt; #include&lt;conio.h&gt; Typdef int Num; Num full=100; Num Calc(int X) {     full=(X&gt;2)?1:2;     return (full%2) } void main {     int full=1000;     full=Calc(::full);     cout&lt;&lt;::full&lt;&lt;"::"&gt;&gt;full&gt;&gt;endl; }</pre>	2
Ans	<pre>#include&lt;iostream.h&gt; #include&lt;conio.h&gt; <b>typdef int Num;</b>           //Typedef should be written as typedef <b>Num full=100;</b></pre>	

	<pre> <b>Num Calc(int X)</b> {     full=(X&gt;2)?1:2;     <u><b>return (full%2);</b></u> //; is missing } <b>void main()</b> {     int full=1000;     full=Calc(:full);     cout&lt;&lt;::full&lt;&lt;"::"&lt;&lt;full&lt;&lt;endl; } </pre> <p>(1/2 mark for every corrected line of code) Or  (1 Mark for only identifying any 4 errors without suggesting corrections)</p>	
(d)	<p>Write the output of the following C++ program code (assume all necessary header files are included in program):</p> <pre> <b>void Encrypt(char *S, int key)</b> {     char *Temp=S;     if(key%2==0)     {         key--;     }     while(*Temp!='\0')     {         *Temp+=key;         Temp+= key;     } } <b>void main()</b> {     int Key_Set[]={1,2,3};     char Pvt_Msg[]="Computer2017";     for(int C=0;C&lt;2;C++)     {         Encrypt(Pvt_Msg, Key_Set[C]);         cout&lt;&lt;"New Encrypted Message after Pass "&lt;&lt;C+1&lt;&lt;" is :"&lt;&lt;Pvt_Msg;         cout&lt;&lt;endl;     } } </pre>	2
Ans	<p>Output:</p> <p>New Encrypted Message after Pass 1 is : Dpnqvufs3128</p> <p>New Encrypted Message after Pass 2 is : Eqorwvgt4239</p>	

		<b>(1 mark of each correct line of output)</b>	
(e)		<p>Write the output of the following C++ program code(assume all necessary header files are included in program):</p> <pre> <b>struct Ticket</b> {     char Level;     int Price; }; <b>void Compute(Ticket &amp;T)</b> {     if (T.Level=='A')         T.Price+=50;     else if (T.Level=='B')         T.Price+=30;     else if (T.Level=='C')         T.Price+=25;     cout&lt;&lt;T.Level&lt;&lt;"::"&lt;&lt;T.Price&lt;&lt;endl; } <b>void main()</b> {     Ticket Mon_Show[ ]={{'C',250},{'A',300},{'B',350}};     for(int count=2;count&gt;=0; )     {         Compute(Mon_Show[count--]);     } } </pre>	3
Ans		<p>Output:</p> <p>B:380 A:350 C:275</p> <p><b>(1 mark of each correct line of output)</b></p>	
(f)		<p>Consider the following C++ program code and choose the option(s) which are <b>not</b> possible as output. Also, print the <b>minimum &amp; maximum</b> value of variable <b>Pick</b> during complete execution of the program.(assume all necessary header files are included in program):</p>	2

	<pre> const int NUM=5; void main() {     randomize();     int V1=1, V2=5, Pick;     while(V1&lt;V2)     {         Pick = random(NUM) + (V2-V1);         cout&lt;&lt;Pick&lt;&lt;"";         V1++;     } } </pre> <p>(a) 5:6:6:6:  (b) 4:7:5:3:  (c) 8:6:1:2:  (d) 7:5:3:1</p>	
	<p>Ans Output:</p> <p>Option (a) &amp; (c)</p> <p>Maximum value of Pick will be 8</p> <p>Minimum value of Pick will be 1</p> <p><b>(1/2 mark for each correct option)</b></p> <p><b>(1 mark each giving correct values of both max &amp; min)</b></p>	
Q2.	(a) What do you mean by Data Abstraction in OOPs? Explain its significance with a suitable example.	2
	<p>Ans Data abstraction in OOPs is the process of showing only the essential details of a class without going into background details.</p> <p>E.g.</p>	

```

#include<iostream.h>
class PRODUCT
{
    int a,b;

public:
    void Mult()
    {
        int c;
        cout<<"Enter 2 nos";
        cin>>a>>b;
        c= a*b;
        cout<<"Product is:"<<c;
    }
};

void main()
{
PRODUCT p;
p.Mult();
}

```

In the above example, public member Mult( ) is invoked using the object p of class PRODUCT. Thus, demonstrating Data abstraction.

**(1 mark for correct definition of data abstraction)**

**(1 mark for giving a valid example)**

(b)	Answer the question (i) & (ii) after going through the following code. (assume all necessary header files are included in program):-	2
-----	--	---

```

class Game
{
    char Name[21];
    int No_of_Players;
public:
    Game()           //Function 1
    {
        strcpy(Name,"Cricket");
        No_of_Players=11;
        cout<<"New Game Starts\n";
    }
    Game(char N[],int No)      //Function 2
    {
        strcpy(Name,N);
        No_of_Players=No;
        cout<<Name<<"comprises "<<No_of_Players<<" number of players\n";
    }
    ~Game()           //Function 3
    {
        cout<<"Game Ends\n";
    }
};

```

- (i) Give the name of the feature of OOP which is implemented by Function 1 & 2 together in the above class Game.
- (ii) Anuj made changes to the above class Game and made Function 3 private. Will he be able to execute the Line 1 successfully given below? Justify.

```

void main()
{
    Game ABC;      //Line 1
}

```

- Ans
- (i) Polymorphism or Function Overloading or Constructor Overloading  
**(1 mark for correct answer)**
  - (ii) Yes, an error “Destructor for Game is not accessible” will come. As there is a destructor defined in the class and it cannot be made private.  
**(1/2 mark for correct answer Yes)**  
**(1/2 mark for correct reason)**

(c) Define a class Bill in OOP with the following specification:-

**Private members:**

1. Bill\_no - type long(bill number)
2. Bill\_period - type integer(number of months)

4

3. No\_of\_calls - type integer(number of mobile calls)  
 4. Payment\_mode - type string(“**online**” or “**offline**”)  
 5. Amount - type float(amount of bill)  
 6. Calculate\_Bill() function to calculate the amount of bill given as per the following conditions:

No_of_calls	Calculation Rate/call (in rupees)
<=500	1.0
501-1200	2.0
>1200	4.0

Also, the value of Amount should be reduced by 5% if Payment\_mode is “online”.

**Public members:**

1. A member function New\_Bill() that will accept the values for Bill\_no, Bill\_period, No\_of\_calls, Payment\_mode from the user and invoke Caluclate\_Bill() to assign the value of Amount.
2. A member function Print\_Bill() that will display all details of a Bill.

	<p>Ans</p> <pre> class Bill {     long Bill_no;     int Bill_period;     int No_of_calls;     char Payment_mode[8];     float Amount;     void Calculate_Bill()     {         if( No_of_calls&lt;=500)             Amount=(No_of_calls)*1.0;         else if( No_of_calls&lt;=1200)             Amount=(No_of_calls)*2.0;         else             Amount=(No_of_calls)*4.0;          if(strcmpi(Payment_mode,"online")==0)             Amount=Amount - (.05)*Amount;     } public:     void New_Bill()     {         cout&lt;&lt;"Enter values for Bill No, Bill Period, No. of calls &amp; Payment mode(online or offline)";         cin&gt;&gt;Bill_no&gt;&gt;Bill_period&gt;&gt;No_of_calls;         gets(Payment_mode);         Calculate_Bill();     }     void Print_Bill()     {         cout&lt;&lt;"Bill No.:"&lt;&lt;Bill_no&lt;&lt;endl;         cout&lt;&lt;"Bill period(in months):"&lt;&lt;Bill_period&lt;&lt;endl;         cout&lt;&lt;"No. of Calls.:"&lt;&lt;No_of_calls&lt;&lt;endl;         cout&lt;&lt;"Payment mode:"&lt;&lt;Payment_mode&lt;&lt;endl;         cout&lt;&lt;"Amount of Bill:"&lt;&lt;Amount&lt;&lt;endl;     } }; </pre>
--	---

**( ½ Mark for correct syntax of class header)**

**( ½ Mark for correct declarations of data members)**

**(1 Mark for correct definition of Caluclate\_Bill() function)**

**(1 Mark for correct definition of New\_Bill() function)**

**(1 Mark for correct definition of print\_Bill() function)**

**Note:**

	<b>Deduct ½ Mark if Caluclate_Bill() is not invoked properly inside New_Bill() function.</b>	
(d)	<p>Answer the question from (i) to (iv) based on the given below code(assume all necessary header files are included in program):-</p> <pre> class City {     int City_Id;     char City_Name[30]; protected:     int City_Population; public:     City();     void Get_Population();     void New_City();     void Show_City(); };  class State : public City {     int State_Id;     char State_Name[25]; protected:     int State_Population; public:     State();     void New_State();     void Print_State(); };  class Country : private State {     int Country_Id;     char Country_Name[25]; public:     Country();     void New_Country();     void Display_Country(); };  (i) Write name of the class whose constructor is invoked first on the creation of a new object of class Country.  (ii) Write name of the data members which are accessible through the object of class Country.  (iii) List name of the members which are accessible through the member function “void New_Country()”.  (iv) What will be the size(in bytes) of an object of class Country &amp; State respectively. </pre>	4

	Ans	<p>(i) class City  <b>(1 mark for correct answer)</b></p> <p>(ii) None  <b>(1 mark for correct answer)</b></p> <p>(iii) Data members: Country_Id, Country_Name[25], State_Population, City_Population  Member functions: Display_Country(), New_State(), Print_State(), Get_Population(), New_City(), Show_City()  <b>(1 mark for correct answer)</b></p> <p>(iv) 90 bytes for object of class Country &amp; 63 bytes for object of class State  <b>(1/2 mark for each correct answer)</b></p>	
Q3	(a)	<p>Write the definition of function named <b>Array_Swap()</b> that will accept an integer array &amp; its size as arguments and the function will interchange/swap elements in such a way that the first element is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd.</p> <p>E.g. if initially array of seven elements is:</p> <p style="text-align: center;"><b>5, 16, 4, 7, 19, 8, 2</b></p> <p>After execution of the above function, the contents of the array will be:</p> <p style="text-align: center;"><b>2,16, 19, 7, 4, 8, 5</b></p>	3
	Ans	<pre>void Array_Swap(int A[],int size) {     int Temp, I;     for(I=0;I&lt;size/2;I++)     {         if((A[I]%2!=0)    (A[size-1-I]%2!=0))         {             Temp=A[I];             A[I]=A[size-1-I];             A[size-1-I]=Temp;         }     } }</pre> <p><b>(½ Mark for correct function header)</b>  <b>(½ Mark for correct loop)</b>  <b>(1 Mark for correct checking of odd elements in each pair)</b>  <b>(1 Mark for swapping the elements)</b></p>	
	(b)	An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base	3

		address of the array and the memory address of element stored at location A[30][25]?	
Ans	<p><b>Row-major Formula:-</b> <math>A[I][J] = B + W * ((I - L_r) * N_c + (J - L_c))</math></p> <p><b>Nr=50, Nc=30, B=? , W=4, Lr=0, Lc=0, A(10,15)=21500</b></p> <p><b>A[10][15]= B + 4*((10-0)*30 + (15-0))</b></p> <p><b>21500= B + 4*(300+15)</b></p> <p><b>21500=B + 4*315</b></p> <p><b>B=21500 – 1260</b></p> <p><b>B=20240</b></p> <p><b>A[30][25] = 20240 + 4*((30-0)*30 + (25-0))</b></p> <p><b>A[30][25] = 20240 + 4*(900+25)</b></p> <p><b>A[30][25] = 20240 + 4*925</b></p> <p><b>A[30][25] = 23940</b></p> <p><b>(1 Mark for using correct formula for row major)</b></p> <p><b>(1/2 Mark each for substituting formula with correct values for calculation of Base address &amp; address of A[30][25] element)</b></p> <p><b>(1/2 Mark for each correct final answer of Base address &amp; address of A[30][25])</b></p>		
(c)	<p>Write the definition of a member function <b>Q_Insert()</b> for a class <b>Exam_Queue</b> in C++ to insert a new <b>Application</b> information in a dynamically allocated queue whose code is already given below as a part of the program (assume all necessary header files are included in program):</p> <pre> <b>struct Application</b> {     int App_Id;     char App_Name[21];     Application *Link; };  <b>class Exam_Queue</b> {     Application *Front, *Rear; public:     Exam_Queue() //Constructor     {         Front=Rear=NULL;     }     void Q_Insert ();     void Q_Delete(); }; </pre>	4	

	<p>Ans</p> <pre> void Exam_Queue::Q_Insert() {     Application *Temp;     Temp=new Application;     cout&lt;&lt;"Enter the values of App. Id &amp; App. Name \n";     cin&gt;&gt;Temp-&gt;App_Id;     gets(Temp-&gt;App_Name);     Temp-&gt;Link = NULL;     if(Front==NULL)         Front=Temp;     else         Rear-&gt;Link=Temp;     Rear=Temp; } </pre> <p><b>(1 Mark for creating new node)</b>  <b>(½ Mark for entering values for the new node)</b>  <b>(½ Mark for assigning NULL value to the new node)</b>  <b>(½ Mark for assigning Front to the first node)</b>  <b>(½ Mark for linking the last node to the new node)</b>  <b>(1 Mark for assigning Rear to the new node)</b></p>																									
(d)	<p>Write the definition of a user-defined function <b>REPEAT_ROW(int A[][3],int R, int C)</b> in C++ that will store the elements in the following manner</p> <ol style="list-style-type: none"> <li>1. All row elements except the 1<sup>st</sup> element replaced by the 1<sup>st</sup> element,</li> <li>2. All row elements except the 1<sup>st</sup> &amp; 2<sup>nd</sup> element replaced by the 2<sup>nd</sup> element,</li> <li>3. All row elements except the 1<sup>st</sup> , 2<sup>nd</sup> &amp; 3<sup>rd</sup> element replaced by the 3<sup>rd</sup> element and so on.</li> </ol> <p>For example: if initially the array was:-</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>5</td><td>6</td><td>10</td><td>2</td></tr> <tr> <td>2</td><td>6</td><td>9</td><td>12</td></tr> <tr> <td>18</td><td>14</td><td>5</td><td>6</td></tr> </table> <p>Then, the contents of the array after execution of the above function will be:-</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>5</td><td>5</td><td>5</td><td>5</td></tr> <tr> <td>2</td><td>6</td><td>6</td><td>6</td></tr> <tr> <td>18</td><td>14</td><td>5</td><td>5</td></tr> </table>	5	6	10	2	2	6	9	12	18	14	5	6	5	5	5	5	2	6	6	6	18	14	5	5	2
5	6	10	2																							
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18	14	5	6																							
5	5	5	5																							
2	6	6	6																							
18	14	5	5																							

	Ans	<pre>void REPEAT_ROW(int A[][3],int R, int C) {     for(int I=0;I&lt;R;I++)     {         int X=A[I][I];         for(int J=I+1;J&lt;C;J++)         {             A[I][J] = X;         }     } }</pre> <p><b>(1 Mark for correct loop)</b>  <b>(1 Mark for correct placing elements)</b></p>																																					
	(e)	Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately:  <b>TRUE, FALSE, OR, NOT, TRUE, FALSE, AND, OR</b>	2																																				
	Ans	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Element Scanned</th> <th>Operation</th> <th>Stack Status</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>True</td> <td>Push (True)</td> <td>True</td> </tr> <tr> <td>2</td> <td>False</td> <td>Push (False)</td> <td>True, False</td> </tr> <tr> <td>3</td> <td>OR</td> <td>Pop(False) Pop(True) OR(True, False)=True Push (True)</td> <td>True</td> </tr> <tr> <td>4</td> <td>NOT</td> <td>Pop(True) NOT(True)=False</td> <td>False</td> </tr> <tr> <td>5</td> <td>True</td> <td>Push (True)</td> <td>False, True</td> </tr> <tr> <td>6</td> <td>False</td> <td>Push (False)</td> <td>False, True, False</td> </tr> <tr> <td>7</td> <td>AND</td> <td>Pop(False) Pop(True) AND(False, True)=False Push False</td> <td>False, False</td> </tr> <tr> <td>8</td> <td>OR</td> <td>Pop(False) Pop(False) OR(False, False)=False</td> <td>False</td> </tr> </tbody> </table>	S. No.	Element Scanned	Operation	Stack Status	1	True	Push (True)	True	2	False	Push (False)	True, False	3	OR	Pop(False) Pop(True) OR(True, False)=True Push (True)	True	4	NOT	Pop(True) NOT(True)=False	False	5	True	Push (True)	False, True	6	False	Push (False)	False, True, False	7	AND	Pop(False) Pop(True) AND(False, True)=False Push False	False, False	8	OR	Pop(False) Pop(False) OR(False, False)=False	False	
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	<p>The result is False</p> <p>(½ Mark for evaluating till OR operator)</p> <p>(½ Mark for evaluating till NOT operator)</p> <p>(½ Mark for evaluating till AND operator)</p> <p>(½ Mark for evaluating till OR operator)</p> <p><b>Note: (1 Mark to be given for writing correct answer as FALSE without showing the Stack Status)</b></p>	
Q4.	<p>(a) Answer the questions (i) &amp; (ii) in the program segment given below for the required task.</p> <pre> class Route {     int Route_No;                      //Route Number     char Route_Name[21];                //Name of Route     int No_Kms;                        //Distance in kms on Route public:     void New_Route();                  //Accepts details of new Route     void Show_Route();                 //Display details of a Route     int Get_RouteNo()                  //Return the Route Number     {         return Route_No;     }     void Update_Kms(int K)     {         No_Kms=K;     } }; void Update_Route(int No, int New_Kms)      //Update No_Kms of a Route {     Route R;     fstream File("ROUTE.DAT",ios::in   ios::out   ios::binary);     while(!File.eof())     {         File.read((char*)&amp;R, sizeof(R));         if( (R.Get_RouteNo())==No)         {             R.Update_Kms(New_Kms);             _____ //Statement 1             _____ //Statement 2             cout&lt;&lt;"Route Details updated\n";         }     }     File.close(); } </pre> <p>(i) Write Statement 1 to position the file pointer to the appropriate place so that the data updation is done for the correct Route.</p> <p>(ii) Write Statement 2 to perform the write operation so that the updation is done in the binary file “ROUTE.DAT”.</p>	1

	Ans	<p>(i) <b>File.seekg(-sizeof(R), ios::cur);</b>  (ii) <b>File.write((char*)&amp;R,sizeof(R));</b>  <b>(½ Mark for each correct answer)</b></p>	
	(b)	<p>Write a user-defined function named <b>Count()</b> that will read the contents of text file named “<b>Report.txt</b>” and display the count of the number of lines that start with either ‘I’ or ‘M’.</p> <p>E.g. In the following paragraph, there are 3 lines starting with ‘I’ or ‘M’:</p> <p><b><i>“India is the fastest growing economy.</i></b></p> <p><b><i>India is looking for more investments around the globe.</i></b></p> <p><b><i>The whole world is looking at India as a great market.</i></b></p> <p><b><i>Most of the Indians can foresee the heights that India is capable of reaching.”</i></b></p>	2
	Ans	<pre>void Count() {     ifstream f("Report.txt");     int C=0;     char S[40];     while(!f.eof())     {         f.getline(S,40,'.');         if((S[0]=='I')    (S[0]=='M'))         {             C++;         }     }     cout&lt;&lt;"No. of line starting with I or M are :"&lt;&lt;C;     f.close(); }</pre> <p><b>(½ Mark for opening opinion.txt correctly)</b>  <b>(½ Mark for fetching each line from the file correctly)</b>  <b>(½ Mark for counting each word)</b>  <b>(½ Mark for correct displaying the no. of lines which starts with ‘M’ or ‘I’)</b></p>	
	(c)	Consider the following class Item:-	3

```

class Item
{
    int ItemId;
    int Quantity;
    float Price;
public:
    void NewItem()
    {
        cin>>ItemId>>Quantity>>Price;
    }
    void ShowItem()
    {
        cout<<ItemId<<":"<<Quantity<<":"<<Price<<endl;
    }
    void Set_Price(float P)
    {
        Price=P;
    }
    int Ret_Id()
    {
        return ItemId;
    }
};

```

Write a function named **Change\_Item(int Id, float Pr)** to modify the price of the item whose Itemid & new price are passed as an argument.

Ans

```

void Change_Item(int Id, float Pr)
{
    fstream File("ITEM.DAT",ios::in|ios::out|ios::binary);
    Item I;
    while(!File.eof())
    {
        File.read((char*)&I, sizeof(I));
        if(I.Ret_Id()==Id)
        {
            I.Set_Price(Pr);
            File.seekg(-sizeof(I), ios::cur);
            File.write((char*)&I, sizeof(I));
        }
    }
    File.close();
}

```

(½ Mark for opening ITEM.DAT correctly)

(1 Mark for reading all records from the file)

(1 Mark for comparing value of Id from file & calling Set\_Price() function)

(½ Mark for writing new value of price in file)

## SECTION – B (Python)

Q1	(a)	Differentiate between break and continue statement with the help of an example.	2
	Ans	break statement is used to terminate the execution of the loop.  For example:	

```

for i in range(6):
    if i==3:
        break
    print i

```

The output of the above code will be:

0  
1  
2

The loop terminates when i becomes 3 due to break statement

Whereas,

continue statement is used to force the next iteration while skipping the statements in the present iteration.

```

for i in range(6):
    if i==3:
        continue
    print i

```

The output of the above code will be:

0  
1  
2  
4  
5

continue statement forces next iteration when i becomes 3 , bypassing the print statement .Thus ,in the output 3 is missing.

**(1 mark for explaining break statement with example)**

**(1 mark for explaining continue statement with example)**

(b)	Identify and write the name of the module to which the following functions belong: i. ceil()    ii. findall()	1
-----	--	---

Ans	i. ceil() - math module ii. findall() – re module  <b>(½ mark for each module)</b>	
-----	---	--

(c)	Observe the following Python code very carefully and rewrite it after removing all syntactical errors with each correction underlined. <pre> DEF execmain():     x= input("Enter a number:")     if(abs(x)= x):         print "You entered a positive number:"     else:         x=*-1         print "Number made positive:"x  execmain() </pre>	2
-----	---	---

	Ans	<pre><b>def</b> execmain():      x= <b>input</b>("Enter a number:")      <b>if</b>(abs(x)== x):          <b>print</b> "You entered a positive number:"      <b>else</b>:          x *= -1          <b>print</b> "Number made positive:", x  execmain()</pre> <p><b>(½ mark for each correction)</b></p>	
	(d)	Write the output of the following Python code:	2
		<pre>i=5 j=7 x=0 i=i+(j-i) x=j+i <b>print</b> x,":",i j=j**2 x=j+i i=i+1 <b>print</b> i,":",j</pre>	
	Ans	14 : 7 8 : 49	
		<b>(1 mark for each line of correct output)</b>	
	(e)	Write the output of the following Python program code:	3
		<pre>Data =['D', 'o', ' ', 'I', 't', ' ', '@', ' ', '1', '2', '3', ' ', '!']  for i in range(len(Data)-1):      if (Data[i].isupper()):         Data[i]=Data[i].lower()     elif (Data[i].isspace()):         Data[i]=Data[i+1] <b>print</b> Data</pre>	
	Ans	['d', 'o', 'T', 'i', 't', '@', '@', 'l', 'l', '2', '3', '!', '!'] <b>(½ mark for converting ‘D’ to ‘d’)</b> <b>(½ mark for converting ‘I’ to ‘i’)</b> <b>(½ mark for substituting each ‘ ’ with the consecutive character)</b>	
	(f)	Study the following program and select the possible output(s) from the options (i) to (iv)	2

	<p>following it. Also, write the maximum and the minimum values that can be assigned to the variable Y.</p> <pre>import random X= random.random() Y= random.randint(0,4) print int(X),":",Y+int(X)</pre> <p>i) 0 : 0 ii) 1 : 6 iii) 2 : 4 iv) 0 : 3</p>	
	<p>Ans i) and iv) are the possible output(s)</p> <p>Minimum value that can be assigned to Y = 0 Maximum value assigned to Y = 3</p> <p><b>( ½ mark for each correct possible output)</b> <b>( ½ mark for each correct possible minimum and maximum value)</b></p>	
Q2	(a) Explain operator overloading with the help of an example.	2
	<p>Ans The feature where an operator can be used in different forms is known as Operator Overloading. It is one of the methods to implement polymorphism.</p> <p>'+' operator behaves differently with different data types. With integers it adds the two numbers and with strings it concatenates or joins two strings. For example: Print 8+9 will give 17 and Print "Python" + "programming" will give the output as Python programming.</p> <p><b>(2 marks for correct explanation using an example)</b> <b>(1 mark for only writing a definition)</b></p>	
	(b) Observe the following Python code and answer the questions (i) and (ii): <pre>class BOOK :     count=0     def __init__(self): # Function 1         self.Author="Not assigned"         self.Publisher = "Not assigned"         self.ISBN = "Not assigned"     def display(self):         print self.Author,self.Publisher,self.ISBN     @staticmethod     def bookcount(): # Function 2         BOOK.count=BOOK.count+1         return BOOK.count</pre>	
	(i) <b>How is data member ‘count’ different from data member ‘Author’?</b>	1
	Ans Data member ‘count’ is a <b>Class attribute</b> whereas the data member ‘Author’ is an	

	<b>Instance attribute.</b> <b>Class Attributes</b> belong to the class itself. These attributes will be shared by all the instances. Such attributes are defined in the class body part, usually at the top, for legibility. Attributes defined for each class instance are known as <b>Instance Attributes</b> . These are called instance attributes and they belong to each instance/object of a class.  <b>(1 mark for correct point of difference)</b>																
(ii)	<b>Fill in the blanks:</b> <b>B= BOOK()</b> _____ #Write statement to invoke Function 2 _____ #Write statement to invoke Function 3	1															
Ans	<b>B.display()</b> <b>BOOK.bookcount()</b>  <b>(½ mark for each correct statement)</b>																
(c)	<p>Define a class COURSE in Python with the following description :</p> <p><b>Instance Attributes:</b></p> <ul style="list-style-type: none"> <li>REGNO Integer</li> <li>CNAME String</li> <li>Score Float</li> <li>Fees Float</li> </ul> <p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>• A constructor to assign REGNO as 0, Score and Fees as 0.0</li> <li>• SetCourse() to assign Course and Fees on the basis of the Score input as per the following criteria:</li> </ul> <table border="1"> <thead> <tr> <th>Score</th> <th>CNAME</th> <th>Fees</th> </tr> </thead> <tbody> <tr> <td>&gt;=9.0 -&lt;=10.0</td> <td>Clinical Psychology</td> <td>10000.0</td> </tr> <tr> <td>&gt;=8.0 - &lt;9.0</td> <td>Corporate Counselling</td> <td>8000.0</td> </tr> <tr> <td>&gt;=5.0 - &lt;8.0</td> <td>Guidance and Counselling</td> <td>6000.0</td> </tr> <tr> <td>less than 5.0</td> <td>Not Eligible</td> <td>0.0</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• GETDATA() to input REGNO and Score and invoke SetCourse()</li> <li>• DISPLAY() to display all the details.</li> </ul>	Score	CNAME	Fees	>=9.0 -<=10.0	Clinical Psychology	10000.0	>=8.0 - <9.0	Corporate Counselling	8000.0	>=5.0 - <8.0	Guidance and Counselling	6000.0	less than 5.0	Not Eligible	0.0	4
Score	CNAME	Fees															
>=9.0 -<=10.0	Clinical Psychology	10000.0															
>=8.0 - <9.0	Corporate Counselling	8000.0															
>=5.0 - <8.0	Guidance and Counselling	6000.0															
less than 5.0	Not Eligible	0.0															

	Ans	<pre> class COURSE:     def __init__(self):         self.REGNO = 0         self.CNAME = " "         self.Score=0.0         self.Fees=0.0     def SetCourse(self):         if (self.Score&gt;=9.0 and self.Score&lt;=10.0):             self.CNAME = "Clinical Psychology"             self.Fees = 10000.0         elif (self.Score&gt;=8.0 and self.Score&lt;9.0):             self.CNAME = "Corporate Counselling"             self.Fees = 8000.0         elif (self.Score&gt;=5.0 and self.Score&lt;8.0):             self.CNAME = "Guidance and Counselling"             self.Fees = 6000.0         elif (self.Score &lt; 5.0):             self.CNAME = "Not Eligible"             self.Fees = 0.0     def GETDATA(self):         self.REGNO = input("Enter Registration number")         self.Score = input("Enter your Score")         self.SetCourse()     def DISPLAY(self):         print self.REGNO         print self.CNAME         print self.Score         print self.Fees </pre> <p>(½ mark for correct definition of <code>__init__()</code>)  (2 marks for correct definition of <code>SetCourse()</code> :      1 mark for applying conditions using <code>if..elif..else</code>      1 mark for assigning correct values to <code>CNAME</code> and <code>Fees</code>  )</p> <p>(1 mark for correct definition of <code>GETDATA()</code>)  (½ mark for correct definition of <code>DISPLAY()</code>)</p>	
	(d)	Answer the questions (i) and (ii) based on the following:	4

```

class Vehicle(object):
    def __init__(self,l=0,w=0):
        self.length=l
        self.width=w
    def define(self):
        print "Vehicle with length", self.length,"in & width",self.width,"in"
class Car(Vehicle):
    def __init__(self,clr,seats,l,w):
        Vehicle.__init__(self,l,w) #Line 3
        self.colour=clr
        self.seatingCapacity=seats
    def changeGears(self,gr):
        print "changed to gear",gr
    def turn(self,direction):
        print "turned to",direction,direction
class RacingCar(Car):
    def __init__(self,clr,seats,l,w,tr,spd): # Line 1
        Car.__init__(self,clr,seats,l,w) #Line 2
        self.turnRadius=tr
        self.speed=spd

    def start(self):
        self.define()
        self.changeGears(2)
        print"Racing car starts-ready to vroom!"

```

	(i)	Explain the relationship between Line 1 , Line 2 and Line 3.	
	Ans	<p><b>Line 1</b> is a parameterized constructor of derived class RacingCar that accepts values for its instance variables turnRadius ,speed . It accepts clr,seats,l,w to initialize the instance variables colour with clr , seatingCapacity with seats of base class Car through its constructor function/<code>__init__()</code>(<b>Line 2</b>) and invokes constructor function/<code>__init__()</code> of base class Vehicle to initialize its instance variables length with l and width with w(<b>Line 3</b>).</p> <p><b>(2 marks for appropriate answer justifying the passing of parameters to initialize members of base class via <code>__init__()</code>)</b></p>	
	(ii)	<p>Predict the output that will be produced on the execution of the following statements :</p> <pre>rcar=RacingCar('Blue',2,206,78.5,6,200) rkar.start() rkar.turn("left")</pre>	
	Ans	<pre>Vehicle with length 1 in &amp; width 78.5 in changed to gear 2 Racing car starts-ready to vroom! turned to left direction</pre> <p><b>(½ mark for each line of output)</b></p>	

Q3	(a)	<p>Write the definition of a function Reverse(X) in Python, to display the elements in reverse order such that each displayed element is the twice of the original element (element * 2) of the List X in the following manner:</p> <p>Example:</p> <p>If List X contains 7 integers is as follows:</p> <table border="1"> <thead> <tr> <th>X[0]</th><th>X[1]</th><th>X[2]</th><th>X[3]</th><th>X[4]</th><th>X[5]</th><th>X[6]</th></tr> </thead> <tbody> <tr> <td>4</td><td>8</td><td>7</td><td>5</td><td>6</td><td>2</td><td>10</td></tr> </tbody> </table> <p>After executing the function, the array content should be displayed as follows:</p> <p style="text-align: center;">20      4      12      10      14      16      8</p>	X[0]	X[1]	X[2]	X[3]	X[4]	X[5]	X[6]	4	8	7	5	6	2	10	2
X[0]	X[1]	X[2]	X[3]	X[4]	X[5]	X[6]											
4	8	7	5	6	2	10											
	Ans	<pre>def Reverse(X):     for i in range(len(X)-1, -1, -1):         print X[i]*2</pre> <p><b>(1 mark for correct loop)</b>  <b>(1 mark for displaying twice of the list element)</b></p>															
	(b)	<p>Consider the following unsorted list :</p> <p>[22, 54, 12, 90, 55, 78]</p> <p>Write the passes of selection sort for sorting the list in ascending order till the 3<sup>rd</sup> iteration.</p>	3														
	Ans	<p>Pass 1: [12, 54, 22, 90, 55, 78]      Pass 2 : [12, 22, 54, 90, 55, 78]      Pass 3 : [12, 22, 54, 90, 55, 78]</p> <p><b>(1 mark to produce correct List after each pass.)</b></p>															
	(c)	<p>Consider the following class Order and do as directed:</p> <pre>class ORDER:     L=[]     def __init__(self):         self.OID = 0     def insertorder(self):         self.OID = input("Enter Order Id")     def delorder(self):         :</pre> <p>i. Fill in the blank 1 with a statement to insert OID in the Queue maintained using List L.</p> <p>ii. Complete the definition of delorder() to delete OID from the Queue maintained using List L, the function should return the OID being deleted or -1 in case the Queue is empty.</p>	4														
	Ans:	<p>i. self.L.append(self.OID)</p> <p><b>( 1 mark for the correct answer)</b></p> <p>ii.</p>															

		<pre> def delorder(self):     if (len(self.L)&lt;0):         print "Order Q is empty"         return(-1)     else:         x= self.L[0]         del(self.L[0])         return(x) </pre> <p>(1 mark for applying condition to check if Queue is empty)  (½ mark for returning -1)  (1 mark for deleting the first element from the Queue)  (½ mark for returning the deleted value)</p>																																					
	d)	Write a generator function to generate odd numbers between a and b (including b). Note: a and b are received as an argument by the function.	3																																				
	Ans:	<pre> def generateodd(a,b) :     for i in range(a,b+1) :         if(i%2!=0) :             yield(i) </pre> <p>(½ mark for correct function header)  (1 mark for correct use of loop)  (½ mark for condition)  (1 mark for using yield() to yield the correct value)</p>																																					
	(e)	Evaluate the following postfix expression using a stack. Show the contents of stack after execution of each operation: 10,40,25,-,* ,15,4,* ,+ <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Symbol</th> <th>Operation</th> <th>Stack</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>Push(10)</td> <td>10</td> <td></td> </tr> <tr> <td>40</td> <td>Push(40)</td> <td>10,40</td> <td></td> </tr> <tr> <td>25</td> <td>Push(25)</td> <td>10,40,25</td> <td></td> </tr> <tr> <td>-</td> <td>Pop(25) Pop(40) Push(40-25) =15</td> <td>10,15</td> <td></td> </tr> <tr> <td>*</td> <td>Pop(15) Pop(10) Push(10*15) =150</td> <td>150</td> <td></td> </tr> <tr> <td>15</td> <td>Push(15)</td> <td>150,15</td> <td></td> </tr> <tr> <td>4</td> <td>Push(4)</td> <td>150,15,4</td> <td></td> </tr> <tr> <td>*</td> <td>Pop(4) Pop(15) Push(15*4)=60</td> <td>150,60</td> <td></td> </tr> </tbody> </table>	Symbol	Operation	Stack	Result	10	Push(10)	10		40	Push(40)	10,40		25	Push(25)	10,40,25		-	Pop(25) Pop(40) Push(40-25) =15	10,15		*	Pop(15) Pop(10) Push(10*15) =150	150		15	Push(15)	150,15		4	Push(4)	150,15,4		*	Pop(4) Pop(15) Push(15*4)=60	150,60		2
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		<table border="1"> <tr> <td style="text-align: center;">+</td><td>Pop(60) Pop(150) Push(150+60)=210</td><td style="text-align: center;">210</td><td style="text-align: center;">210</td><td></td></tr> </table>	+	Pop(60) Pop(150) Push(150+60)=210	210	210		
+	Pop(60) Pop(150) Push(150+60)=210	210	210					
		<p>(½ mark for correct stack status till ‘-’)</p> <p>(½ mark for correct stack status till ‘*’)</p> <p>(½ mark for correct stack status till ‘*’)</p> <p>(½ mark for correct stack status till ‘+’)</p> <p>or</p> <p><b>(½ mark for writing the correct result without showing the working of Stack)</b></p>						
Q4.	(a)	Nancy intends to position the file pointer to the beginning of a text file. Write Python statement for the same assuming F is the Fileobject.	1					
	Ans	F.seek(0)						
		<b>(1 mark for the correct answer)</b>						
	(b)	<p>Write a function <b>countmy()</b> in Python to read the text file “DATA.TXT” and count the number of times “my” occurs in the file.</p> <p>For example if the file “DATA.TXT” contains:</p> <p>“This is my website. I have displayed my preferences in the CHOICE section.”</p> <p>The <b>countmy()</b> function should display the output as:</p> <p>“my occurs 2 times”.</p>	2					
	Ans	<pre>def countmy():     f= open("DATA.TXT", "r")     count =0     x=f.read()     word= x.split()     for i in word:         if (i=="my"):             count=count+1     print "my occurs",count,"times"</pre> <p>(½ mark for reading the file using <code>read</code>)</p> <p>(½ mark for correctly using <code>split()</code>)</p> <p>(½ mark for the correct loop)</p> <p><b>(½ mark for displaying the correct value of count)</b></p>						
	(c)	Write a function in Python to search and display details of all those students, whose stream is “HUMANITIES” from pickled file “Student.dat”. Assuming the pickled file is containing the objects of the following class:	3					

```

class STUDENT:
    def __init__(self):
        self.RNO = 0
        self.NAME = " "
        self.STREAM = " "
        self.PERCENT = 0.0
    def ACCEPT(self):
        self.RNO = input("Enter Roll no")
        self.NAME = raw_input("Enter Name")
        self.STREAM = raw_input("Enter Stream")
        self.PERCENT = input("Enter percentage")
    def DISPLAY(self):
        print self.RNO, self.NAME, self.STREAM, self.PERCENT
    def RET_STREAM(self):
        return(self.STREAM)

```

Ans:

```

def readfile():

    f= open("Student.dat","rb")

    try:
        while(True):
            S= pickle.load(f)
            if(S.RET_STREAM() == "HUMANITIES"):
                S.DISPLAY()
    except EOFError:
        pass
    f.close()

```

(½ mark for opening the file in correct mode)

(½ mark for try.. except EOFError)

(½ mark for while loop)

(½ mark for using pickle.load() correctly)

(½ mark for comparison using if)

(½ mark for displaying)

### SECTION – C

Q5	(a)	Differentiate between DDL & DML commands. Identify DDL & DML commands from the following:-  (UPDATE, SELECT, ALTER, DROP)	2
	Ans	<p><b>DDL stands for Data Definition language and comprises of commands which will change the structure of database object.</b></p> <p><b>DML stands for Data Manipulation Language and comprises of commands which are used to insert, edit, view &amp; delete the data stored in a database object.</b></p> <p><b>DDL Commands: ALTER, DROP</b></p> <p><b>DML Commands: UPDATE, SELECT</b></p>	

	(1 Mark for correct definition of DDL & DML commands) (½ Mark each for correct identification of commands)																																																											
(b)	<p>Consider the following relations MobileMaster &amp; MobileStock:-</p> <p style="text-align: center;"><b><u>MobileMaster</u></b></p> <table border="1"> <thead> <tr> <th>M_Id</th> <th>M_Company</th> <th>M_Name</th> <th>M_Price</th> <th>M_Mf_Date</th> </tr> </thead> <tbody> <tr> <td>MB001</td> <td>Samsung</td> <td>Galaxy</td> <td>4500</td> <td>2013-02-12</td> </tr> <tr> <td>MB003</td> <td>Nokia</td> <td>N1100</td> <td>2250</td> <td>2011-04-15</td> </tr> <tr> <td>MB004</td> <td>Micromax</td> <td>Unite3</td> <td>4500</td> <td>2016-10-17</td> </tr> <tr> <td>MB005</td> <td>Sony</td> <td>XperiaM</td> <td>7500</td> <td>2017-11-20</td> </tr> <tr> <td>MB006</td> <td>Oppo</td> <td>SelfieEx</td> <td>8500</td> <td>2010-08-21</td> </tr> </tbody> </table> <p style="text-align: center;"><b><u>MobileStock</u></b></p> <table border="1"> <thead> <tr> <th>S_Id</th> <th>M_Id</th> <th>M_Qty</th> <th>M_Supplier</th> </tr> </thead> <tbody> <tr> <td>S001</td> <td>MB004</td> <td>450</td> <td>New Vision</td> </tr> <tr> <td>S002</td> <td>MB003</td> <td>250</td> <td>Praveen Gallery</td> </tr> <tr> <td>S003</td> <td>MB001</td> <td>300</td> <td>Classic Mobile Store</td> </tr> <tr> <td>S004</td> <td>MB006</td> <td>150</td> <td>A-one Mobiles</td> </tr> <tr> <td>S005</td> <td>MB003</td> <td>150</td> <td>The Mobile</td> </tr> <tr> <td>S006</td> <td>MB006</td> <td>50</td> <td>Mobile Centre</td> </tr> </tbody> </table> <p>Write the SQL query for questions from (i) to (iv) &amp; write the output of SQL command for questions from (v) to (viii) given below:-</p> <ul style="list-style-type: none"> <li>(i) Display the Mobile company, Mobile name &amp; price in descending order of their manufacturing date.</li> <li>(ii) List the details of mobile whose name starts with ‘S’.</li> <li>(iii) Display the Mobile supplier &amp; quantity of all mobiles except ‘MB003’.</li> <li>(iv) To display the name of mobile company having price between 3000 &amp; 5000.</li> <li>(v) SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;</li> <li>(vi) SELECT MAX(M_Mf_Date), MIN(M_Mf_Date) FROM MobileMaster;</li> <li>(vii) SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty&gt;=300;</li> </ul>	M_Id	M_Company	M_Name	M_Price	M_Mf_Date	MB001	Samsung	Galaxy	4500	2013-02-12	MB003	Nokia	N1100	2250	2011-04-15	MB004	Micromax	Unite3	4500	2016-10-17	MB005	Sony	XperiaM	7500	2017-11-20	MB006	Oppo	SelfieEx	8500	2010-08-21	S_Id	M_Id	M_Qty	M_Supplier	S001	MB004	450	New Vision	S002	MB003	250	Praveen Gallery	S003	MB001	300	Classic Mobile Store	S004	MB006	150	A-one Mobiles	S005	MB003	150	The Mobile	S006	MB006	50	Mobile Centre	6
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		(viii) SELECT AVG(M_Price) FROM MobileMaster;																							
Ans		<p>(i) <b>SELECT M_Company, M_Name, M_Price FROM MobileMaster ORDER BY M_Mf_Date DESC;</b>  <b>(½ mark for correct SELECT)</b>  <b>(½ mark for correct ORDER BY)</b></p> <p>(ii) <b>SELECT * FROM MobileMaster WHERE M_Name LIKE 'S%';</b>  <b>(½ mark for correct SELECT)</b>  <b>(½ mark for correct WHERE clause)</b></p> <p>(iii) <b>SELECT M_Supplier, M_Qty FROM MobileStock WHERE M_Id &lt;&gt; 'MB003';</b>  <b>(½ mark for correct SELECT)</b>  <b>(½ mark for correct WHERE clause)</b></p> <p>(iv) <b>SELECT M_Company FROM MobileMaster WHERE M_Price BETWEEN 3000 AND 5000;</b>  <b>(½ mark for correct SELECT)</b>  <b>(½ mark for correct BETWEEN clause)</b></p> <p>(v)</p> <table border="1"> <thead> <tr> <th>M_Id</th> <th>SUM(M_Qty)</th> </tr> </thead> <tbody> <tr> <td>MB004</td> <td>450</td> </tr> <tr> <td>MB003</td> <td>400</td> </tr> <tr> <td>MB001</td> <td>300</td> </tr> <tr> <td>MB006</td> <td>200</td> </tr> </tbody> </table> <p><b>(½ mark for correct output)</b></p> <p>(vi)</p> <table border="1"> <thead> <tr> <th>MAX(M_Mf_Date)</th> <th>MIN(M_Mf_Date)</th> </tr> </thead> <tbody> <tr> <td>2017-11-20</td> <td>2010-08-21</td> </tr> </tbody> </table> <p><b>(½ mark for correct output)</b></p> <p>(vii)</p> <table border="1"> <thead> <tr> <th>M_Id</th> <th>M_Name</th> <th>M_Qty</th> <th>M_Supplier</th> </tr> </thead> <tbody> <tr> <td>MB004</td> <td>Unite3</td> <td>450</td> <td>New_Vision</td> </tr> </tbody> </table>	M_Id	SUM(M_Qty)	MB004	450	MB003	400	MB001	300	MB006	200	MAX(M_Mf_Date)	MIN(M_Mf_Date)	2017-11-20	2010-08-21	M_Id	M_Name	M_Qty	M_Supplier	MB004	Unite3	450	New_Vision	
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(½ mark for correct output)

(viii) 5450

(½ mark for correct output)

Q6. (a) State &amp; prove De-Morgan's law using truth table.

2

**Ans** **De-morgan's Law:**  $(A+B)' = A'.B'$   
 $(A.B)' = A'+B'$

**Proof using Truth Table**

A	B	A+B	(A+B)'	A'	B'	A'.B'
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

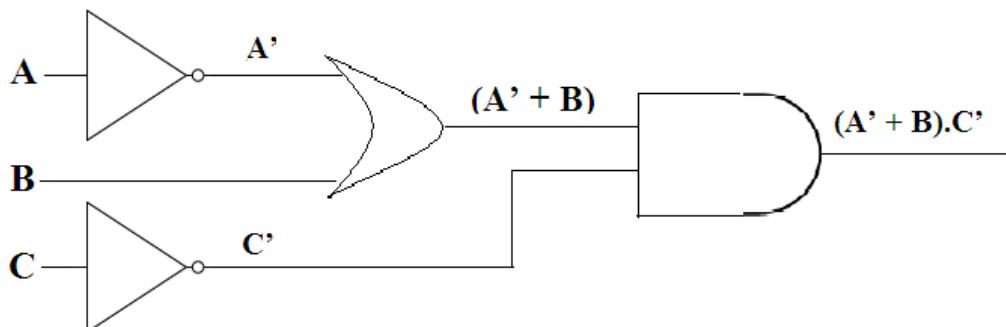
(½ mark each for stating correct De-morgan's law)

(1 mark for correct proof)

(b) Draw the equivalent logic circuit diagram of the following Boolean expression:-  
 $(A' + B).C'$

2

**Ans** Logic Circuit Diagram for  $(A' + B).C'$  is given as:-



(½ mark each for correct placement of gate)

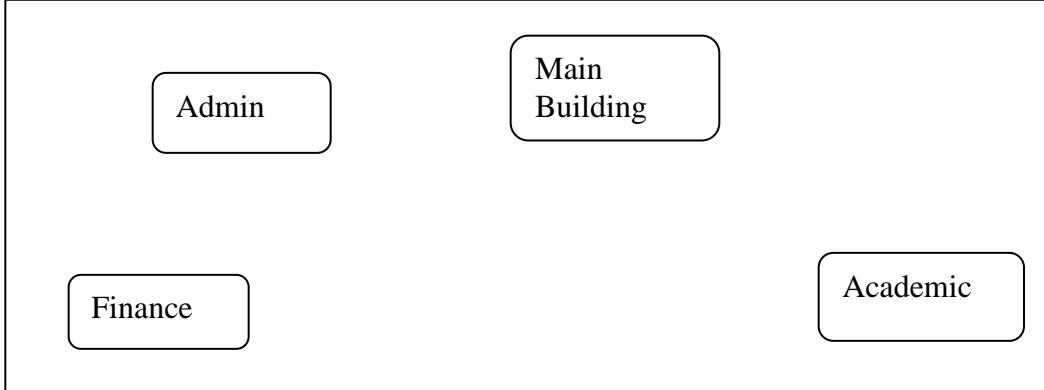
(c) Write the SOP form for the Boolean Function F(X,Y,Z) represented by the given truth table:-

1

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1

		<table border="1"> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </table>	0	1	1	0	1	0	0	0	1	0	1	0	1	1	0	1	1	1	1	1	
0	1	1	0																				
1	0	0	0																				
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1	1	0	1																				
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	Ans	<p><b>SOP Form is : <math>X'Y'Z + X'Y'Z' + X'YZ + XY'Z'</math></b></p> <p><b>(1 mark for correct answer)</b></p> <p><b>Note: Deduct <math>\frac{1}{2}</math> mark if wrong variable names are written in the expression</b></p>																					
	(d)	<p>Reduce the following Boolean expression using K-Map:-</p> $F(U,V,W,Z) = \pi(0,2,5,7,12,13,15)$	3																				
	Ans	<p><b>POS form using K-Map is given as:-</b></p> <p>Pair 1</p> <table border="1"> <tr><td>W+Z</td><td>W+Z'</td><td>W'+Z'</td><td>W'+Z</td></tr> <tr><td>U+V</td><td>0 0</td><td>1</td><td>3 2</td></tr> <tr><td>U+V'</td><td>4</td><td>0 5</td><td>0 7</td></tr> <tr><td>U'+V'</td><td>0 12</td><td>0 13</td><td>0 15</td></tr> <tr><td>U'+V</td><td>8</td><td>9</td><td>11 10</td></tr> </table> <p>Quad 1</p> <p>Pair 2</p> <p>Quad 1: (<math>V'+Z'</math>)</p> <p>Pair 1: (<math>U+V+Z</math>)</p> <p>Pair 2: (<math>U'+V'+W</math>)</p> <p><b>POS Form: <math>(V'+Z').(U+V+Z).(U'+V'+W)</math></b></p> <p><b>( <math>\frac{1}{2}</math> Mark for drawing K-Map with correct variable names)</b></p> <p><b>( <math>\frac{1}{2}</math> Mark each for correct placement of 0)</b></p> <p><b>( <math>\frac{1}{2}</math> Mark each for 3 groupings)</b></p> <p><b>( <math>\frac{1}{2}</math> Mark for writing final expression in reduced/minimal form)</b></p> <p><b>Note: Deduct <math>\frac{1}{2}</math> mark if wrong variable names are used</b></p>	W+Z	W+Z'	W'+Z'	W'+Z	U+V	0 0	1	3 2	U+V'	4	0 5	0 7	U'+V'	0 12	0 13	0 15	U'+V	8	9	11 10	
W+Z	W+Z'	W'+Z'	W'+Z																				
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U'+V	8	9	11 10																				
Q7.	(a)	A teacher provides " <a href="http://www.XtSchool.com/default.aspx">http://www.XtSchool.com/default.aspx</a> " to his/her students to	1																				

		identify the URL & domain name.	
	Ans	<p><b>URL: <a href="http://www.XtSchool.com/default.aspx">http://www.XtSchool.com/default.aspx</a></b></p> <p><b>Domain name: XtSchool.com</b></p> <p><b>(½ mark for each correct answer)</b></p>	
	(b)	<p>Which out of the following does <b>not</b> come under Cyber Crime?</p> <ul style="list-style-type: none"> <li>(i) Copying data from the social networking account of a person without his/her information &amp; consent.</li> <li>(ii) Deleting some files, images, videos, etc. from a friend's computer with his consent.</li> <li>(iii) Viewing &amp; transferring funds digitally from a person's bank account without his/her knowledge.</li> <li>(iv) Intentionally making a false account on the name of a celebrity on a social networking site.</li> </ul>	1
	Ans	<p><b>(ii)</b></p> <p><b>(1 mark for correct answer)</b></p>	
	(c)	<p>Expand the following:-</p> <p style="text-align: center;">1. GSM                          2. TDMA</p>	1
	Ans	<p><b>GSM: Global System for Mobile Communication</b></p> <p><b>TDMA: Time Division Multiple Access</b></p> <p><b>(½ mark for each correct answer)</b></p>	
	(d)	What is the significance of cookies stored on a computer?	1
	Ans	<p>Cookies is small text file that web servers send to a web browser so that the web server can keep track of the user's activity on a particular website.</p> <p><b>(1 mark for correct answer)</b></p>	
	(e)	<p>Kabir wants to purchase a Book online and placed the order for that book using an e-commerce website. Now, he is going to pay the amount for that book online using his Mobile, he needs which of the following to complete the online transaction:-</p> <ul style="list-style-type: none"> <li>1. A bank account,</li> <li>2. A Mobile connection/phone which is attached to above bank account,</li> <li>3. The mobile banking app of the above bank installed on that mobile,</li> </ul>	1

		<p>4. Login credentials(UserId &amp; Password) provided by the bank, 5. All of above.</p>																						
	Ans	<p><b>Option No.5</b>   <b>(1 mark for correct answer)</b></p>																						
	(f)	What do you mean by data encryption? For what purpose it is used for?	1																					
	Ans	<p><b>Data encryption is a technique used for data security in which original message is converted or encoded using an algorithm into a form not understood by anyone except the person who has the key to decode it.</b></p> <p><b>(½ mark for correct definition)</b> <b>(½ mark for its purpose: data security)</b></p>																						
	(g)	<p>Sanskar University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office &amp; web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions in the campus &amp; other details which are given below:</p> <div style="text-align: center; margin-top: 20px;">  <pre> graph TD     Admin[Admin] --- MainBuilding[Main Building]     Admin --- Finance[Finance]     Admin --- Academic[Academic]     MainBuilding --- Finance     MainBuilding --- Academic     Finance --- Academic   </pre> </div> <p>The distances between various buildings of university are given as:-</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th><b>Building 1</b></th> <th><b>Building 2</b></th> <th><b>Distance(in mtrs.)</b></th> </tr> </thead> <tbody> <tr> <td>Main</td> <td>Admin</td> <td>50</td> </tr> <tr> <td>Main</td> <td>Finance</td> <td>100</td> </tr> <tr> <td>Main</td> <td>Academic</td> <td>70</td> </tr> <tr> <td>Admin</td> <td>Finance</td> <td>50</td> </tr> <tr> <td>Finance</td> <td>Academic</td> <td>70</td> </tr> <tr> <td>Admin</td> <td>Academic</td> <td>60</td> </tr> </tbody> </table> <p>Number of computers:-</p>	<b>Building 1</b>	<b>Building 2</b>	<b>Distance(in mtrs.)</b>	Main	Admin	50	Main	Finance	100	Main	Academic	70	Admin	Finance	50	Finance	Academic	70	Admin	Academic	60	
<b>Building 1</b>	<b>Building 2</b>	<b>Distance(in mtrs.)</b>																						
Main	Admin	50																						
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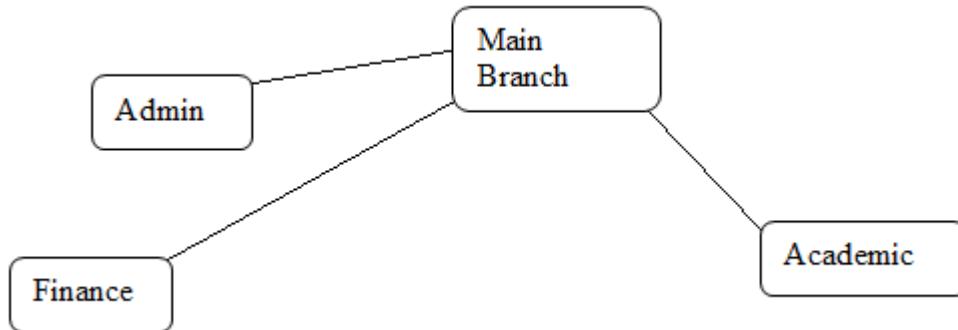
<b>Building</b>	<b>No. of Computers</b>
Main	150
Admin	75
Finance	50
Academic	60

As a network expert, you are required to give best possible solutions for the given queries of the university administration:-

- (a) Suggest cable layout for the connections between the various buildings, 1
- (b) Suggest the most suitable building to house the server of the network of the university, 1
- (c) Suggest the placement of following devices with justification: 1
  - 1. Switch/Hub
  - 2. Repeater
- (d) Suggest the technology out of the following for setting-up very fast Internet connectivity among buildings of the university 1
  - 1. Optical Fibre
  - 2. Coaxial cable
  - 3. Ethernet Cable

Ans

- (a) Star topology



**(1 mark for drawing correct layout)**

- (b) Server should be placed at Main Building as it has the maximum number of computers.

**(1 mark for correct answer)**

- (c) Hub/Switch each would be needed in all the buildings to interconnect the group of cables from the different computers in each building

A repeater needs to be placed along the wire between main building & finance building as the distance between them is more than 70 mtr.

**(½ mark for each correct placement)**

**(½ mark for each correct justification)**

(d) Optical Fibre

**(1 mark for correct answer)**

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**SQP - Computer Science (Code: 083)**  
**Class XII (2016-17)**

Time: 3Hrs.			MM: 70
Instructions:			
i. All Questions are Compulsory. ii. Programming Language : Section – A : C++ iii. Programming Language : Section – B : Python iv. Answer either Section A or B and Section C is compulsory			
Section – A			
1	(a)	Explain conditional operator with suitable example?	2
	(b)	Which C++ header file(s) are essentially required to be included to run/execute the following C++ code : <pre>void main() { char *word1="Hello",*word2="Friends"; streat(word1,word2); cout&lt;&lt;word1; }</pre>	1
	(c)	Rewrite the following program after removing the syntactical errors (if any). Underline each correction.  <pre>#include&lt;conio.h&gt; #include&lt;iostream.h&gt; #include&lt;string.h&gt; #include&lt;stdio.h&gt; class product {     int product_code,qty,price;     char name[20]; public: product() {     product_code=0;qty=0;price=0;     name=NULL; } void entry() {</pre>	2

	<pre> cout&lt;&lt;"\n Enter code,qty,price"; cin&gt;&gt;product_code&gt;&gt;qty&gt;&gt;price; gets(name); } void tot_price() {return qty*price;} }; void main() { p product; p.entry(); cout&lt;&lt;tot_price(); } </pre>	
(d)	<p>Write the output of the following C++ program code:</p> <p>Note: Assume all required header files are already being included in the program.</p> <pre> <b>void change(int *s)</b> { <b>for</b>(int i=0;i&lt;4;i++) {     <b>if</b>(*s&lt;40)     {         <b>if</b>(*s%2==0)         *s=*s+10;         <b>else</b>         *s=*s+11;     }     <b>else</b>     {         <b>if</b>(*s%2==0)         *s=*s-10;         <b>else</b>         *s=*s-11;     }     cout&lt;&lt;*s&lt;&lt;" ";     s++; } } <b>void main()</b> { </pre>	2

		<pre>int score[]={25,60,35,53}; change(score); }</pre>	
	(e)	<p>Write the output of the following C++ program code:  Note: Assume all required header files are already being included in the program.</p> <pre>class seminar { char topic[30]; int charges; public: seminar() { strcpy(topic,"Registration"); charges=5000; } seminar(char t[]) { strcpy(topic,t); charges=5000; } seminar(int c) { strcpy(topic,"Registration with Discount"); charges=5000-c; } void regis(char t[],int c) { strcpy(topic,t); charges=charges+c; } void regis(int c=2000) { charges=charges+c; } void subject(char t[],int c) { strcpy(topic,t); charges=charges+c;</pre>	3

	<pre> } void show() { cout&lt;&lt;topic&lt;&lt;"@"&lt;&lt;charges&lt;&lt;endl; } };  void main() { seminar s1,s2(1000),s3("Genetic Mutation"),s4; s1.show(); s2.show(); s1.subject('ICT',2000); s1.show(); s2.regis("Cyber Crime",2500); s2.show(); s3.regis(); s3.show(); s4=s2; s4.show(); getch(); } </pre>	
(f)	<p>Observe the following program carefully and attempt the given questions:</p> <pre> #include&lt;iostream.h&gt; #include&lt;conio.h&gt; #include&lt;stdlib.h&gt; void main() { clrscr(); randomize(); char courses[][10]={"M.Tech","MCA","MBA","B.Tech"}; int ch; for(int i=1;i&lt;=3;i++) {     ch=random(i)+1;     cout&lt;&lt;courses[ch]&lt;&lt;"\t"; } getch(); } </pre>	2

		<p>I. Out of all the four courses stored in the variable courses, which course will never be displayed in the output and which course will always be displayed at first in the output?</p> <p>II. Mention the minimum and the maximum value assigned to the variable ch?</p>	
2	(a)	What do you understand by Function overloading or Functional polymorphism? Explain with suitable example.	2
	(b)	<p>Answer the questions(i) and (ii) after going through the following class:</p> <pre><b>class planet</b> {     <b>char name[20];char distance[20];</b> <b>public:</b>     <b>planet()</b>                                //Function 1     {         <b>strcpy(name, "Venus");</b>         <b>strcpy(distance,"38 million km");</b>     }     <b>void display(char na[],char d[])</b>          //Function 2     {         <b>cout&lt;&lt;na&lt;&lt;"has "&lt;&lt;d&lt;&lt;" distance from Earth"&lt;&lt;endl;</b>     }     <b>planet(char na[], char d[])</b>                //Function 3     {         <b>strcpy(name,na);</b>         <b>strcpy(distance,d);</b>     }     <b>~planet()</b>                                //Function 4     {         <b>cout&lt;&lt;"Planetarium time over!!!!"&lt;&lt;endl;</b>     } };</pre>	2
		I. What is Function 1 referred as? When will it be executed?	
		II. Write suitable C++ statement to invoke Function 2.	
	(c)	Define a class DanceAcademy in C++ with following description: Private Members <ul style="list-style-type: none"><li>• Enrollno of type int</li></ul>	4

		<ul style="list-style-type: none"> <li>• Name of type string</li> <li>• Style of type string</li> <li>• Fee of type float</li> <li>• A member function chkfee( ) to assign the value of fee variable according to the style entered by the user according to the criteria as given below:</li> </ul> <table border="1"> <thead> <tr> <th>Style</th><th>Fee</th></tr> </thead> <tbody> <tr> <td>Classical</td><td>10000</td></tr> <tr> <td>Western</td><td>8000</td></tr> <tr> <td>Freestyle</td><td>11000</td></tr> </tbody> </table> <p><b>Public Members</b></p> <ul style="list-style-type: none"> <li>• A function enrollment() to allow users to enter values for Enrollno,Name, Style and call function chkfee()to assign value of fee variable according to the Style entered by the user.</li> <li>• A function display() to allow users to view the details of all the data members.</li> </ul>	Style	Fee	Classical	10000	Western	8000	Freestyle	11000	
Style	Fee										
Classical	10000										
Western	8000										
Freestyle	11000										
(d)		<p><b>Answer the questions (i) to (iv) based on the following:</b></p> <pre> <b>class indoor_sports</b> {     int i_id;     char i_name[20];     char i_coach[20]; <b>protected:</b>     int i_rank,i_fee;     void get_ifee(); <b>public:</b>     indoor_sports();     void iEntry();     void ishow(); };  <b>class outdoor_sports</b> {     int o_id;     char o_name[20]; } </pre>	4								

		<pre> <b>char o_coach[20];</b> <b>protected:</b>     <b>int orank,ofee;</b>     <b>void get_ofee();</b> <b>public:</b>     <b>outdoor_sports();</b>     <b>void oEntry();</b>     <b>void oshow();</b> <b>};</b> <b>class sports:public indoor_sports,protected outdoor_sports</b> {     <b>char rules[20];</b> <b>public:</b>     <b>sports();</b>     <b>void registration();</b>     <b>void showdata();</b> <b>};</b> </pre>	
		(i) Name the type of inheritance illustrated in the above C++ code.	
		(ii) Write the names of all the members, which are accessible from the objects belonging to class outdoor_sports.	
		(iii) Write the names of all the member functions, which are accessible from the member function of class sports.	
		(iv) What will be the size of the object belonging to class indoor_sports?	
3	(a)	<p>Write the definition of a function grace_score (int score [], int size) in C++, which should check all the elements of the array and give an increase of 5 to those scores which are less than 40.</p> <p>Example: if an array of seven integers is as follows:</p> <p style="text-align: center;"><b>45, 35, 85, 80, 33, 27, 90</b></p> <p>After executing the function, the array content should be changed as follows:</p> <p style="text-align: center;"><b>45, 40, 85, 80, 38, 32, 90</b></p>	3
	(b)	An array P[30][20] is stored along the column in the memory with each element requiring 2 bytes of storage. If the base address of the array P is 26500, find out the location of P[20][10].	3

	(c)	<p>Write the definition of a member function push() for a class Library in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part of the program:</p> <pre><b>struct book</b> { <b>int bookid;</b> <b>char bookname[20];</b> <b>book *next;</b> };  <b>class Library</b> { <b>book *top;</b> <b>public:</b> <b>Library()</b> { <b>top=NULL;</b> } <b>void push();</b> <b>void pop();</b> <b>void disp();</b> <b>~Library();</b> };</pre>	4												
	(d)	<p>Write a user-defined function swap_row(int ARR[ ][3],int R,int C) in C++ to swap the first row values with the last row values:</p> <p>For example if the content of the array is:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>10</td><td>20</td><td>30</td></tr> <tr> <td>40</td><td>50</td><td>60</td></tr> <tr> <td>70</td><td>80</td><td>90</td></tr> </table> <p>Then after function call, the content of the array should be:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>70</td><td>80</td><td>90</td></tr> </table>	10	20	30	40	50	60	70	80	90	70	80	90	2
10	20	30													
40	50	60													
70	80	90													
70	80	90													

		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>10</td><td>20</td><td>30</td></tr> </table>	10	20	30	
10	20	30				
	(e)	<p>Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately:</p> <p style="text-align: center;"><b>45, 45, +, 32, 20, 10, /, -, *</b></p>	2			
4	(a)	<p>Find the output of the following C++ code considering that the binary file sp.dat already exists on the hard disk with 2 records in it.</p> <pre> <b>class sports</b> {     <b>int id;</b>     <b>char sname[20];</b>     <b>char coach[20];</b>     <b>public:</b>         <b>void entry();</b>         <b>void show();</b>         <b>void writing();</b>         <b>void reading();</b> }s;  <b>void sports::reading()</b> {     <b>ifstream i;</b>     i.open("sp.dat");     <b>while(1)</b>     {         i.read((char*)&amp;s,sizeof(s));         if(i.eof())             break;         else             cout&lt;&lt;"\n"&lt;&lt;i.tellg();     }     i.close(); } <b>void main()</b> {     s.reading(); }</pre>	1			
	(b)	<p>Write a user defined function word_count() in C++ to count how many words are present in a text file named “opinion.txt”.</p>	2			

	<p>For example, if the file opinion.txt contains following text:</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Co-education system is necessary for a balanced society. With co-education system, Girls and Boys may develop a feeling of mutual respect towards each other.</p> </div> <p>The function should display the following:      Total number of words present in the text file are: 24</p>	
(c)	<p>Write a function display () in C++ to display all the students who have got a distinction(scored percentage more than or equal to 75) from a binary file “stud.dat”, assuming the binary file is containing the objects of the following class:</p> <pre><b>class student</b> {     <b>int rno;</b>     <b>char sname [20];</b>     <b>int percent;</b>     <b>public:</b>     <b>int retrpercent()</b>     {         <b>return percent;</b>     }     <b>void getdetails()</b>     {         <b>cin&gt;&gt;rno;</b>         <b>gets(sname);</b>         <b>cin&gt;&gt;percent;</b>     }     <b>void showdetails()</b>     {         <b>cout&lt;&lt;rno;</b>         <b>puts(sname);</b>         <b>cout&lt;&lt;percent;</b>     } };</pre>	3

**Section - B (Python)**

1	(a)	<p>Carefully observe the following python code and answer the questions that follow:</p> <pre>x=5 def func2():     x=3     global x     x=x+1     print x     print x</pre> <p>On execution the above code produces the following output.</p> <p>6 3</p> <p>Explain the output with respect to the scope of the variables.</p>	2
	(b)	<p>Name the modules to which the following functions belong:</p> <p>a. uniform()      b. fabs()</p>	1
	(c)	<p>Rewrite the following code after removing the syntactical errors (if any). Underline each correction.</p> <pre>def chksum:     x= input("Enter a number")     if (x%2 = 0):         for i range(2*x):             print i     loop else:         print "#"</pre>	2
	(d)	<p>Observe the following Python code carefully and obtain the output, which will appear on the screen after execution of it.</p> <pre>def Findoutput():     L = "earn"     X=""     L1=[]     count = 1     for i in L:         if i in['a','e','i','o','u']:             X=X+i.swapcase()         else:             if (count%2!=0):                 X= X+str(len(L[:count]))             else:                 X = X+i         count = count+1     print X Findoutput()</pre>	2

	(e)	<p>What output will be generated when the following Python code is executed?</p> <pre>def ChangeList():     L=[]     L1=[]     L2=[]     for i in range(1,10):         L.append(i)     for i in range(10,1,-2):         L1.append(i)     for i in range(len(L1)):         L2.append(L1[i]+L[i])     L2.append(len(L)-len(L1))     print L2 ChangeList()</pre>	3
	(f)	<p>Observe the following program and answer the questions that follow:</p> <pre>import random import random X=3 N = random.randint(1,X) for i in range(N):     print i,'#',i+1</pre> <p>a. What is the minimum and maximum number of times the loop will execute?  b. Find out, which line of output(s) out of (i) to (iv) will not be expected from the program?</p> <ul style="list-style-type: none"> <li>i. 0#1</li> <li>ii. 1#2</li> <li>iii. 2#3</li> <li>iv. 3#4</li> </ul>	2
2	a	Explain the two strategies employed by Python for memory allocation.	2
	b	Observe the following class definition and answer the questions that follow:	2

	<pre> class Info:     ips=0     def __str__(self): #Function 1         return " Welcome to the Info Systems"     def __init__(self):         self.__Systemdate=""         self.SystemTime=""     def getinput(self):         self.__Systemdate = raw_input("enter data")         self.SystemTime=raw_input("enter data")         Info.incrips()     @staticmethod #Statement 1     def increps():         Info.ips=Info.ips+1         print " System invoked",Info.ips,"times" I=Info() I.getinput() print I.SystemTime print I.__Systemdate # Statement 2 </pre> <p>i. Write statement to invoke Function 1.  ii. On Executing the above code , Statement 2 is giving an error explain.</p>					
c	<p>Define a class PRODUCT in Python with the following specifications</p> <p>Data members:</p> <p>Pid – A string to store productid.</p> <p>Pname - A string to store the name of the product.</p> <p>Pcostprice – A decimal to store the cost price of the product</p> <p>Psellingprice – A decimal to store Selling Price</p> <p>Margin - A decimal to be calculated as Psellingprice - Pcostprice</p> <p>Remarks - To store "Profit" if Margin is positive else "Loss" if Margin is negative</p> <p>Member Functions:</p> <ul style="list-style-type: none"> <li>• A constructor function to initialize All the data members with valid default values.</li> <li>• A method SetRemarks() that assigns Margin as Psellingprice - Pcostprice and sets Remarks as mentioned below:</li> </ul> <table border="1"> <thead> <tr> <th><u>Margin</u></th><th><u>Remarks</u></th></tr> </thead> <tbody> <tr> <td>&lt;0 ( negative)</td><td>Loss</td></tr> </tbody> </table>	<u>Margin</u>	<u>Remarks</u>	<0 ( negative)	Loss	4
<u>Margin</u>	<u>Remarks</u>					
<0 ( negative)	Loss					

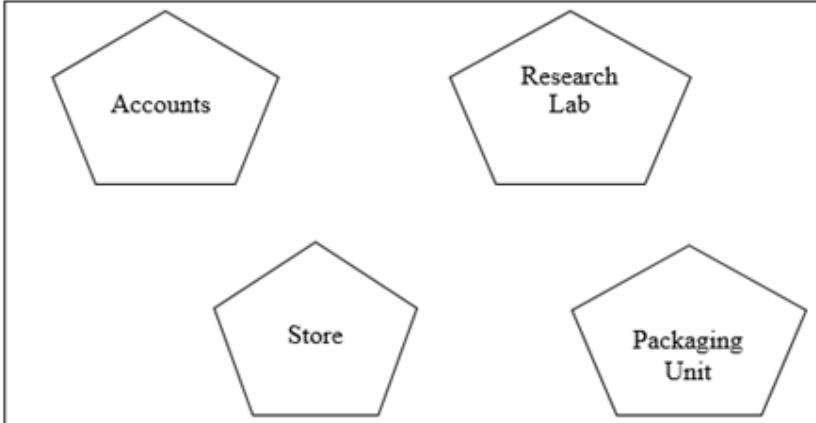
	<table border="1"> <tr> <td>&gt;0(positive)</td><td>Profit</td></tr> </table>	>0(positive)	Profit	
>0(positive)	Profit			
	<ul style="list-style-type: none"> <li>● A method Getdetails() to accept values for Pid,Pname,Pcostprice,Psellingprice and invokes SetRemarks() method.</li> <li>- A method Setdetails() that displays all the data members.</li> </ul>			
d	<p>Answer the questions (i) to (iv) based on the following:</p> <pre> class Shop(object):     def __init__(self):         self.no_of_employees =0         self.no_of_brands=0     def getSdata(self):         self.no_of_employees=input("Number of employees")         self.no_of_brands=input("Number of brands")     def showSdata(self):         print self.no_of_employees         print self.no_of_brands class Brand (object):     def __init__(self):         self.name = ""         self.category=["Mens","Womens","Kids"]         self.avgprice=0.0     def getdata(self):         self.name = raw_input("Enter Brand Name")         self.avgprice = input("Enter Average Price")     def showdata(self):         print self.name         print self.category         print self.avgprice  class Mall(Brand,Shop):     def __init__(self):         self.no_of_shops =0     def getdata(self):         super(Mall,self).getSdata()      # Statement1         super(Mall,self).getdata()      # Statement 2         self.no_of_shops = input("Enter number of shops")     def showdata(self):         print self.no_of_shops         print self.no_of_brands         _____ </pre> <p style="text-align: right;"># Blank 1</p>	4		

		i. Which type of Inheritance is demonstrated in the above code?  ii. Explain Statement 1 and 2.  iii. Name the methods that are overridden along with their class name.	
		iv. Fill Blank1 with a statement to display variable category of class Brand.	
3	a	Consider the following unsorted list  95 79 19 43 52 3  Write the passes of bubble sort for sorting the list in ascending order till the 3rd iteration.	3
	b	Kritika was asked to accept a list of even numbers but she did not put the relevant condition while accepting the list of numbers. You are required to write a code to convert all the odd numbers into even by multiplying them by 2.	3
	c	Aastha wants to create a program that accepts a string and <u>display the characters in the reverse order in the same line using a Stack</u> . She has created the following code , help her by completing the definitions on the basis of requirements given below :  class mystack:  def __init__(self): self.mystr= _____ # Accept a string self.mylist = _____ # Convert mystr to a list  # Write code to display while removing elements from the stack.  def disp(self): : :  # Write code to display while removing elements from the stack.	4
	d	Write a generator function generatesq() that displays the squareroots of numbers from 100 to n where n is passed as an argument .	2
	e	Evaluate the following Postfix expression:  20,10,-,15,3,/,+,5,*	2
4	a	Observe the following code and answer the questions that follow:  File = open("Mydata","a")  _____ #Blank1  File.close()  i. What type (Text/Binary) of file is Mydata?	1

		ii. Fill the Blank 1 with statement to write “ABC” in the file “Mydata”						
	b	<p>A text file “Quotes.Txt” has the following data written in it:</p> <p>Living a life you can be proud of      Doing your best      Spending your time with people and activities that are important to you      Standing up for things that are right even when it’s hard      Becoming the best version of you</p> <p>Write a user defined function to display the total number of words present in the file.</p>	2					
	c	<p>Consider the following class declaration and answer the question that follows:</p> <pre>import pickle class Student:     def __init__(self):         self.name=""         self.percent=0.0     def inputdata(self):         self.name=raw_input("Enter Name")         self.percent=input("Enter Percentage scored")     def returnpercent(self):         return (self.percent)     def displaydata(self):         print "Name:",self.name         print "Percent:",self.percent</pre> <p>A</p> <p>nuj has been asked to display all the students who have scored less than 40 for Remedial Classes.</p> <p>Write a user defined function to display all those students who have scored less than 40 from the binary file “Student.dat” assuming it stores all the object of the class Student mentioned above.</p>	3					
Section – C								
5	(a)	Observe the table ‘Club’ given below:	2					
<b>Club</b>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Member_id</td><td style="padding: 5px;">Member_Name</td><td style="padding: 5px;">Address</td><td style="padding: 5px;">Age</td><td style="padding: 5px;">Fee</td></tr> </table>				Member_id	Member_Name	Address	Age	Fee
Member_id	Member_Name	Address	Age	Fee				

	<table border="1"> <tr><td>M002</td><td>Nisha</td><td>Gurgaon</td><td>19</td><td>3500</td></tr> <tr><td>M003</td><td>Niharika</td><td>New Delhi</td><td>21</td><td>2100</td></tr> <tr><td>M004</td><td>Sachin</td><td>Faridabad</td><td>18</td><td>3500</td></tr> </table>	M002	Nisha	Gurgaon	19	3500	M003	Niharika	New Delhi	21	2100	M004	Sachin	Faridabad	18	3500																																											
M002	Nisha	Gurgaon	19	3500																																																							
M003	Niharika	New Delhi	21	2100																																																							
M004	Sachin	Faridabad	18	3500																																																							
	<p>i. What is the cardinality and degree of the above given table?</p> <p>ii. If a new column contact_no has been added and three more members have joined the club then how these changes will affect the degree and cardinality of the above given table.</p>																																																										
(b)	<p>Write SQL commands for the queries (i) to (iv) and output for (v) to (viii) based on the tables ‘Watches’ and ‘Sale’ given below.</p> <p><b>Watches</b></p> <table border="1"> <thead> <tr><th>Watchid</th><th>Watch_Name</th><th>Price</th><th>Type</th><th>Qty_Store</th></tr> </thead> <tbody> <tr><td>W001</td><td>HighTime</td><td>10000</td><td>Unisex</td><td>100</td></tr> <tr><td>W002</td><td>LifeTime</td><td>15000</td><td>Ladies</td><td>150</td></tr> <tr><td>W003</td><td>Wave</td><td>20000</td><td>Gents</td><td>200</td></tr> <tr><td>W004</td><td>HighFashion</td><td>7000</td><td>Unisex</td><td>250</td></tr> <tr><td>W005</td><td>GoldenTime</td><td>25000</td><td>Gents</td><td>100</td></tr> </tbody> </table> <p><b>Sale</b></p> <table border="1"> <thead> <tr><th>Watchid</th><th>Qty_Sold</th><th>Quarter</th></tr> </thead> <tbody> <tr><td>W001</td><td>10</td><td>1</td></tr> <tr><td>W003</td><td>5</td><td>1</td></tr> <tr><td>W002</td><td>20</td><td>2</td></tr> <tr><td>W003</td><td>10</td><td>2</td></tr> <tr><td>W001</td><td>15</td><td>3</td></tr> <tr><td>W002</td><td>20</td><td>3</td></tr> <tr><td>W005</td><td>10</td><td>3</td></tr> <tr><td>W003</td><td>15</td><td>4</td></tr> </tbody> </table> <p>i. To display all the details of those watches whose name ends with ‘Time’</p> <p>ii. To display watch’s name and price of those watches which have price range in between 5000-15000.</p> <p>iii. To display total quantity in store of Unisex type watches.</p> <p>iv. To display watch name and their quantity sold in first quarter.</p> <p>v. select max(price), min(qty_store) from watches;</p>	Watchid	Watch_Name	Price	Type	Qty_Store	W001	HighTime	10000	Unisex	100	W002	LifeTime	15000	Ladies	150	W003	Wave	20000	Gents	200	W004	HighFashion	7000	Unisex	250	W005	GoldenTime	25000	Gents	100	Watchid	Qty_Sold	Quarter	W001	10	1	W003	5	1	W002	20	2	W003	10	2	W001	15	3	W002	20	3	W005	10	3	W003	15	4	6
Watchid	Watch_Name	Price	Type	Qty_Store																																																							
W001	HighTime	10000	Unisex	100																																																							
W002	LifeTime	15000	Ladies	150																																																							
W003	Wave	20000	Gents	200																																																							
W004	HighFashion	7000	Unisex	250																																																							
W005	GoldenTime	25000	Gents	100																																																							
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W005	10	3																																																									
W003	15	4																																																									

		<p>vi. select quarter, sum(qty_sold) from sale group by quarter;</p> <p>vii. select watch_name, price, type from watches w, sale s where w.watchid!=s.watchid;</p> <p>viii. select watch_name, qty_store, sum(qty_sold), qty_store-sum(qty_sold) "Stock" from watches w, sale s where w.watchid=s.watchid group by s.watchid;</p>																																					
6	(a)	<p>Correct the following boolean statements:</p> <ol style="list-style-type: none"> <li>1. <math>X+1 = X</math></li> <li>2. <math>(A')' = A'</math></li> <li>3. <math>A+A'=0</math></li> <li>4. <math>(A+B)' = A \cdot B</math></li> </ol>	2																																				
	(b)	<p>Draw the equivalent logic circuit for the following Boolean expression:</p> $(A \cdot B) + C$	1																																				
	(c)	<p>Write the POS form of a Boolean Function F, which is represented in a truth tale as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>P</th> <th>Q</th> <th>R</th> <th>F</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	P	Q	R	F	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	1	1	0	0	0	1	0	1	1	1	1	0	0	1	1	1	1	2
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	(d)	<p>Reduce the following Boolean Expression using K Map:</p> $F(A,B,C,D) = \Sigma(0,1,3,5,6,7,9,11,13,14,15)$	3																																				
7	(a)	<p>Identify the type of topology on the basis of the following:</p> <ol style="list-style-type: none"> <li>1. Since every node is directly connected to the server, a large</li> </ol>	2																																				

		<p>amount of cable is needed which increases the installation cost of the network.</p> <p>2. It has a single common data path connecting all the nodes.</p>									
	(b)	<p>Expand the following:</p> <p>a. VOIP b. SMTP</p>	1								
	(c)	Who is a hacker?	1								
	(d)	<p>The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.</p> <p>140.179.220.200</p> <p>What is it? What is its importance?</p>	1								
	(e)	Daniel has to share the data among various computers of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.	1								
	(f)	<p>Rehaana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:</p>  <p>Distances between various buildings are as follows:</p> <table border="1"> <tbody> <tr> <td>Accounts to Research Lab</td> <td>55 m</td> </tr> <tr> <td>Accounts to Store</td> <td>150 m</td> </tr> <tr> <td>Store to Packaging Unit</td> <td>160 m</td> </tr> <tr> <td>Packaging Unit to Research Lab</td> <td>60 m</td> </tr> </tbody> </table>	Accounts to Research Lab	55 m	Accounts to Store	150 m	Store to Packaging Unit	160 m	Packaging Unit to Research Lab	60 m	
Accounts to Research Lab	55 m										
Accounts to Store	150 m										
Store to Packaging Unit	160 m										
Packaging Unit to Research Lab	60 m										

Accounts to Packaging Unit	125 m
Store to Research Lab	180 m

Number of Computers

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

As a network expert, provide the best possible answer for the following queries:

- i) Suggest a cable layout of connections between the buildings.
- ii) Suggest the most suitable place (i.e. buildings) to house the organization.
- iii) Suggest the placement of the following device with justification:
  - a) Repeater
  - b) Hub/Switch
- iv) Suggest a system (hardware/software) to prevent unauthorized access to or from the network.

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**Marking Scheme- Computer Science (Code: 083)**  
**Class XII (2016-17)**

<b>Time: 3 Hrs.</b>		<b>MM: 70</b>	
Instructions:			
i. All Questions are Compulsory. ii. Programming Language : Section – A : C++ iii. Programming Language : Section – B : Python iv. Answer either Section A or B and Section C is compulsory.			
<b>Section – A</b>			
1	(a)	Explain conditional operator with suitable example? <span style="float: right;">2</span>  Ans      Conditional operator is also known as ternary operator because it requires three operands and can be used to replace simple if-else code. It is used to check the condition and execute first expression if condition is true else execute other.  Syntax: <b>Conditional expression? Expression 1 : Expression 2;</b>  Explanation:  If the conditional expression is true then expression 1 executes otherwise expression 2 executes.  Example: <b>int y=10,x; x=y&gt;10?1:0; cout&lt;&lt;x;</b>  Output: 0  (1 Mark for correct explanation) (1 Mark for correct example)	
	(b)	Which C++ header file(s) are essentially required to be included to run/execute the following C++ code : <b>void main() {</b>	1

		<pre> <b>char *word1="Hello",*word2="Friends";</b> <b>strcat(word1,word2);</b> <b>cout&lt;&lt;word1;</b> <b>}</b> </pre>	
	Ans	<pre> <b>iostream.h</b> <b>string.h</b> </pre> <p>(½ Mark each for writing correct header file)</p>	
	(c)	<p>Rewrite the following program after removing the syntactical errors (if any). Underline each correction.</p> <pre> <b>#include&lt;conio.h&gt;</b> <b>#include&lt;iostream.h&gt;</b> <b>#include&lt;string.h&gt;</b> <b>#include&lt;stdio.h&gt;</b> <b>class product</b> {     <b>int product_code,qty,price;</b>     <b>char name[20];</b> <b>public:</b> <b>product()</b>{         <b>product_code=0;qty=0;price=0;</b>         <b>name=NULL;</b>     } <b>void entry()</b> {     cout&lt;&lt;"\n Enter code,qty,price";     cin&gt;&gt;<b>product_code</b>&gt;&gt;qty&gt;&gt;price;     gets(name); } <b>void tot_price() {return qty*price;}</b> }; <b>void main()</b> {     p <b>product</b>;     p.entry();     cout&lt;&lt;tot_price(); } </pre>	2
	Ans	<pre> <b>#include&lt;conio.h&gt;</b> </pre>	

	<pre> #include&lt;iostream.h&gt; #include&lt;string.h&gt; #include&lt;stdio.h&gt; class product {     int product_code,qty,price;     char name[20]; public: product(){     product_code=0;qty=0;price=0;     <u>strcpy(name,NULL);</u> } void entry() {     cout&lt;&lt;"\n Enter code,qty,price";     cin&gt;&gt;product_code&gt;&gt;qty&gt;&gt;price;     gets(name); } int tot_price() {return qty*price;} }; void main() {     <u>product p;</u>     p.entry();     cout&lt;&lt;<u>p.tot_price();</u> } </pre> <p>(½ Mark for each correction upto a maximum of four corrections)  <b>OR</b>  (1 Mark for only identifying any 4 errors without suggesting corrections)</p>	
(d)	<p>Write the output of the following C++ program code:  Note: Assume all required header files are already being included in the program.</p> <pre> void change(int *s) {     for(int i=0;i&lt;4;i++)     {         if(*s&lt;40) </pre>	2

		<pre> { if(*s%2==0) *s=*s+10; else *s=*s+11; } else { if(*s%2==0) *s=*s-10; else *s=*s-11; } cout&lt;&lt;*s&lt;&lt;" "; s++; } }  <b>void main()</b> { int score[]={25,60,35,53}; change(score); } </pre>	
	Ans	36 50 46 42 <b>(½ Mark for each correct value of output)</b>	
	(e)	<p>Write the output of the following C++ program code: Note: Assume all required header files are already being included in the program.</p> <pre> <b>class seminar</b> { char topic[30]; int charges; public: <b>seminar()</b> { strcpy(topic,"Registration"); charges=5000; } <b>seminar(char t[])</b> { </pre>	3

```
strcpy(topic,t);
charges=5000;
}
seminar(int c)
{
strcpy(topic,"Registration with Discount");
charges=5000-c;
}
void regis(char t[],int c)
{
strcpy(topic,t);
charges=charges+c;
}
void regis(int c=2000)
{
charges=charges+c;
}
void subject(char t[],int c)
{
strcpy(topic,t);
charges=charges+c;
}
void show()
{
cout<<topic<<"@"<<charges<<endl;
}
};
void main()
{
seminar s1,s2(1000),s3("Genetic Mutation"),s4;
s1.show();
s2.show();
s1.subject("ICT",2000);
s1.show();
s2.regis("Cyber Crime",2500);
s2.show();
s3.regis();
s3.show();
s4=s2;
s4.show();
```

		<b>getch();</b> }	
	Ans	<p><b>Registration@5000</b>  <b>Registration with Discount@4000</b>  <b>ICT@7000</b>  <b>Cyber Crime@6500</b>  <b>Genetic Mutation@7000</b>  <b>Cyber Crime@6500</b></p> <p><b>(½ Mark for each correct line of output)</b></p> <p><b>Note:</b></p> <p><b>Deduct ½ Mark for not considering any “@” symbol.</b></p>	
	(f)	<p>Observe the following program carefully and attempt the given questions:</p> <pre>#include&lt;iostream.h&gt; #include&lt;conio.h&gt; #include&lt;stdlib.h&gt; void main() { clrscr(); randomize(); char courses[][10]={"M.Tech","MCA","MBA","B.Tech"}; int ch; for(int i=1;i&lt;=3;i++) {     ch=random(i)+1;     cout&lt;&lt;courses[ch]&lt;&lt;"\t"; } getch(); }</pre> <p>I. Out of all the four courses stored in the variable courses, which course will never be displayed in the output and which course will always be displayed at first in the output?</p> <p>II. Mention the minimum and the maximum value assigned to the variable ch?</p>	2
	Ans	<p>I. M.Tech will never be displayed in the output.  MCA will always be displayed at first in the output.</p>	

		<p>II. Minimum value of ch=1 Maximum value of ch=3</p> <p><b>(½ Mark for each correct answer)</b></p> <p><b>Note:</b></p> <p><b>Deduct ½ Mark for writing any additional option.</b></p>	
2	(a)	What do you understand by Function overloading or Functional polymorphism? Explain with suitable example.	2
	Ans	<p>It is a method of using the same function or method to work using different sets of input. Function overloading is one of the example of polymorphism, where more than one function carrying same name behave differently with different set of parameters passed to them.</p> <pre><b>void show()</b> {     cout&lt;&lt;"\n Hello World!"; } <b>void show(char na[])</b> {     cout&lt;&lt;"\n Hello World! Its "&lt;&lt;na; }</pre> <p>(1 Mark for correct explanation of Function overloading) (1 Mark for suitable example of Function overloading)</p>	
	(b)	<p>Answer the questions(i) and (ii) after going through the following class:</p> <pre><b>class planet</b> {     char name[20];char distance[20]; <b>public:</b>     <b>planet()</b>                                //Function 1     {         strcpy(name, "Venus");         strcpy(distance,"38 million km");     }     <b>void display(char na[],char d[])</b>          //Function 2     {         cout&lt;&lt;na&lt;&lt;"has "&lt;&lt;d&lt;&lt;" distance from Earth"&lt;&lt;endl;     } }</pre>	2

		<pre>         } <b>planet(char na[], char d[])</b>          //Function 3 {     strcpy(name,na);     strcpy(distance,d); } ~<b>planet()</b>                      //Function 4 {     cout&lt;&lt;"Planetarium time over!!!"&lt;&lt;endl; } ;</pre>									
		I. What is Function 1 referred as? When will it be executed?									
		II. Write suitable C++ statement to invoke Function 2.									
	Ans	<p>I. Constructor It will be executed at the time of object creation. <b>(½ Mark for each correct answer)</b></p>									
		<p>II. planet p; p.display("Pluto","7.5 Billion Km"); <b>(½ Mark for each correct answer)</b></p>									
	(c)	<p>Define a class DanceAcademy in C++ with following description: Private Members</p> <ul style="list-style-type: none"> <li>• Enrollno of type int</li> <li>• Name of type string</li> <li>• Style of type string</li> <li>• Fee of type float</li> <li>• A member function chkfee( ) to assign the value of fee variable according to the style entered by the user according to the criteria as given below:</li> </ul> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Style</th> <th>Fee</th> </tr> </thead> <tbody> <tr> <td>Classical</td> <td>10000</td> </tr> <tr> <td>Western</td> <td>8000</td> </tr> <tr> <td>Freestyle</td> <td>11000</td> </tr> </tbody> </table> <p>Public Members</p>	Style	Fee	Classical	10000	Western	8000	Freestyle	11000	4
Style	Fee										
Classical	10000										
Western	8000										
Freestyle	11000										

		<ul style="list-style-type: none"> <li>• A function enrollment() to allow users to enter values for Enrollno, Name, Style and call function chkfee() to assign value of fee variable according to the Style entered by the user.</li> <li>• A function display() to allow users to view the details of all the data members.</li> </ul>	
	Ans	<pre> <b>class DanceAcademy</b> {     <b>int Enrollno;</b>     <b>char Name[20];</b>     <b>char Style[20];</b>     <b>float Fee;</b>     <b>void chkfee()</b>     {         <b>if(strcmp(Style, "Classical")==0)</b>             <b>Fee=10000;</b>         <b>else if(strcmp(Style, "Western")==0)</b>             <b>Fee=8000;</b>         <b>else if(strcmp(Style, "Freestyle")==0)</b>             <b>Fee=11000;</b>     }     <b>public:</b>         <b>void enrollment()</b>         {             cout&lt;&lt;"Please enter Enrollno,Name,Style";             cin&gt;&gt;Enrollno;             gets(Name);             gets(Style);             chkfee();         }         <b>void display()</b>         {             cout&lt;&lt;"\n Entered Enrollno, Name, Style and Fee is: " &lt;&lt;Enrollno &lt;&lt;"\t" &lt;&lt;Name &lt;&lt;"\t" &lt;&lt;Style &lt;&lt;"\t" &lt;&lt;Fee;         } };  ( ½ Mark for correct syntax of class header) ( ½ Mark for correct declarations of data members) </pre>	

	<p><b>(1 Mark for correct definition of chkfee() function)</b>  <b>(1 Mark for correct definition of enrollment () function)</b>  <b>(1 Mark for correct definition of display () function)</b></p> <p><b>Note:</b></p> <p><b>Deduct ½ Mark if chkfee() is not invoked properly inside enrollment() function.</b></p>	
(d)	<p><b>Answer the questions (i) to (iv) based on the following:</b></p> <pre>class indoor_sports {     int i_id;     char i_name[20];     char i_coach[20]; protected:     int i_rank,i_fee;     void get_ifee(); public:     indoor_sports();     void iEntry();     void ishow(); };  class outdoor_sports {     int o_id;     char o_name[20];     char o_coach[20]; protected:     int orank,ofee;     void get_ofee(); public:     outdoor_sports();     void oEntry();     void oshow(); };  class sports:public indoor_sports,protected outdoor_sports {     char rules[20]; public:     sports();</pre>	4

		<b>void registration();</b> <b>void showdata();</b> };	
		(i) Name the type of inheritance illustrated in the above C++ code.	
	Ans	Multiple Inheritance  <b>(1 Mark for correct answer)</b>	
		(ii) Write the names of all the members, which are accessible from the objects belonging to class outdoor_sports.	
	Ans	Data Members: None Member Functions: oEntry(), oShow()  <b>(1 Mark for correct answer)</b> <b>Note:</b> <b>No marks to be awarded for any partial or additional answer(s)</b>	
		(iii) Write the names of all the member functions, which are accessible from the member function of class sports.	
	Ans	registration(), showdata(), oEntry(), oShow(), get_ofee(), iEntry(), iShow(), get_ifee()  <b>(1 Mark for correct answer)</b> <b>Note:</b> <b>No marks to be awarded for any partial or additional answer(s)</b>	
		(iv) What will be the size of the object belonging to class indoor_sports?	
	Ans	46 Bytes <b>(1 Mark for correct answer)</b>	
3	(a)	<p>Write the definition of a function grace_score (int score [], int size) in C++, which should check all the elements of the array and give an increase of 5 to those scores which are less than 40.</p> <p>Example: if an array of seven integers is as follows:</p> <p style="text-align: center;"><b>45, 35, 85, 80, 33, 27, 90</b></p> <p>After executing the function, the array content should be changed as follows:</p> <p style="text-align: center;"><b>45, 40, 85, 80, 38, 32, 90</b></p>	3

	Ans	<pre><b>void grace_score(int score[],int size)</b> {     <b>for(int i=0;i&lt;size;i++)</b>     {         <b>if(score[i]&lt;40)</b>             <b>score[i]=score[i]+5;</b>         <b>cout&lt;&lt;score[i]&lt;&lt;" ";</b>     } }</pre> <p>(½ Mark for correct function header)  <b>(1 Mark for correct loop)</b>  <b>(½ Mark for correct checking of array elements for less than 40)</b>  <b>(1 Mark each for Adding value 5 to the array elements which has value less than 40)</b></p>	
	(b)	An array P[30][20] is stored along the column in the memory with each element requiring 2 bytes of storage. If the base address of the array P is 26500, find out the location of P[20][10].	3
	Ans	<p>Total number of rows= 30  Total size= 2 bytes  Base Address= 26500</p> <p><math>LOC(P[I][J]) = BaseAddress + ((I-LBR) + (J-LBC) * R) * W</math>  Assuming Lower Bound of Row(LBR)=0  Lower Bound of Column(LBC)=0  Total number of Rows(R)=30  Size of each element(W)=2</p> <p><math>LOC(P[20][10]) = 26500 + ((20-0) + (10-0) * 30) * 2</math>  <math>LOC(P[20][10]) = 26500 + 640</math>  <math>LOC(P[20][10]) = 27140</math></p> <p><b>(1 Mark for using correct formula for column major)</b>  <b>(1 Mark for substituting formula with correct values)</b>  <b>(1 Mark for correct final answer)</b></p>	
	(c)	Write the definition of a member function push() for a class Library in C++ to insert a book information in a dynamically allocated stack	4

		<p>of books considering the following code is already written as a part of the program:</p> <pre> <b>struct book</b> {     int bookid;     char bookname[20];     book *next; };  <b>class Library</b> {     book *top; public:     Library()     {         top=NULL;     }     void push();     void pop();     void disp();     ~Library(); }; </pre>	
	Ans	<pre> <b>void Library::push()</b> {     book *nptr;     nptr=new book;     cout&lt;&lt;"Enter values for bookid and bookname";     cin&gt;&gt;nptr-&gt;bookid;     gets(nptr-&gt;bookname);     nptr-&gt;next=NULL;     if(top==NULL)         top=nptr;     else     {         nptr-&gt;next=top;         top=nptr;     } } </pre> <p>(1 Mark for creating new node)</p>	

		<p>(½ Mark for taking values from user)  (½ Mark for storing NULL in the variable responsible for linking in newly created node)  (1 Mark for correct checking of top to be NULL or not and associate statement)  (1 Mark for correct else part)</p>																			
	(d)	<p>Write a user-defined function swap_row(int ARR[ ][3],int R,int C) in C++ to swap the first row values with the last row values:</p> <p>For example if the content of the array is:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>10</td><td>20</td><td>30</td></tr> <tr> <td>40</td><td>50</td><td>60</td></tr> <tr> <td>70</td><td>80</td><td>90</td></tr> </table> <p>Then after function call, the content of the array should be:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>70</td><td>80</td><td>90</td></tr> <tr> <td>40</td><td>50</td><td>60</td></tr> <tr> <td>10</td><td>20</td><td>30</td></tr> </table>	10	20	30	40	50	60	70	80	90	70	80	90	40	50	60	10	20	30	2
10	20	30																			
40	50	60																			
70	80	90																			
70	80	90																			
40	50	60																			
10	20	30																			
	Ans	<pre>void swap_row(int ARR[][3],int R,int C) { for(int i=0,j=0;j&lt;C;j++) {     int temp=ARR[i][j];     ARR[i][j]=ARR[R-1][j];     ARR[R-1][j]=temp; } }</pre> <p>(1 Mark for correct loop)  (1 Mark for correct swapping)</p>																			
	(e)	<p>Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately:</p> <p><b>45, 45, +, 32, 20, 10, /, -, *</b></p>	2																		

	Ans	<table border="1"> <thead> <tr> <th>Element Scanned</th><th>Stack Status</th></tr> </thead> <tbody> <tr><td>45</td><td>45</td></tr> <tr><td>45</td><td>45, 45</td></tr> <tr><td>+</td><td>90</td></tr> <tr><td>32</td><td>90, 32</td></tr> <tr><td>20</td><td>90,32,20</td></tr> <tr><td>10</td><td>90,32,20,10</td></tr> <tr><td>/</td><td>90,32,2</td></tr> <tr><td>-</td><td>90,30</td></tr> <tr><td>*</td><td>2700</td></tr> </tbody> </table> <p>Hence the final result is 2700  <b>(½ Mark for evaluating till + operator)</b>  <b>(½ Mark for evaluating till / operator)</b>  <b>(½ Mark for evaluating till - operator)</b>  <b>(½ Mark for evaluating till * operator)</b></p> <p><b>Note:</b>  <b>(1 Mark to be given for writing correct answer as 2700 without showing the Stack Status)</b></p>	Element Scanned	Stack Status	45	45	45	45, 45	+	90	32	90, 32	20	90,32,20	10	90,32,20,10	/	90,32,2	-	90,30	*	2700	
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45	45																						
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/	90,32,2																						
-	90,30																						
*	2700																						
4	(a)	<p>Find the output of the following C++ code considering that the binary file sp.dat already exists on the hard disk with 2 records in it.</p> <pre> <b>class sports</b> {     int id;     char sname[20];     char coach[20]; public:     void entry();     void show();     void writing();     void reading(); }s;  <b>void sports::reading()</b> {     ifstream i;     i.open("sp.dat"); } </pre>	1																				

		<pre> <b>while(1)</b> {     <b>i.read((char*)&amp;s,sizeof(s));</b>     <b>if(i.eof())</b>         <b>break;</b>     <b>else</b>         <b>cout&lt;&lt;"\n"&lt;&lt;i.tellg();</b>     }     <b>i.close();</b> } <b>void main()</b> {     <b>s.reading();</b> } </pre>	
	Ans	<p>42 84</p> <p><b>(½ Mark for each correct answer)</b></p>	
	(b)	<p>Write a user defined function word_count() in C++ to count how many words are present in a text file named “opinion.txt”.</p> <p>For example, if the file opinion.txt contains following text:</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Co-education system is necessary for a balanced society. With co-education system, Girls and Boys may develop a feeling of mutual respect towards each other.</p> </div> <p>The function should display the following: Total number of words present in the text file are: 24</p>	2
	Ans	<pre> <b>void word_count()</b> {     <b>ifstream i;char ch[20];int c=0;</b>     <b>i.open("opinion.txt ");</b>     <b>while(!i.eof())</b>     {         <b>i&gt;&gt;ch;</b>         <b>c=c+1;</b>     } } </pre>	

	<pre><b>cout&lt;&lt;" Total number of words present in the text file are: "&lt;&lt;c;</b> }</pre> <p>(½ Mark for opening opinion.txt correctly)  (½ Mark for fetching each word from the file correctly)  (½ Mark for counting each word)  (½ Mark for correct display)</p>	
(c)	<p>Write a function display () in C++ to display all the students who have got a distinction(scored percentage more than or equal to 75) from a binary file “stud.dat”, assuming the binary file is containing the objects of the following class:</p> <pre><b>class student</b> {     <b>int rno;</b>     <b>char sname [20];</b>     <b>int percent;</b>     <b>public:</b> <b>int retpercent()</b>     {         <b>return percent;</b>     } <b>void getdetails()</b>     {         <b>cin&gt;&gt;rno;</b>         <b>gets(sname);</b>         <b>cin&gt;&gt;percent;</b>     } <b>void showdetails()</b>     {         <b>cout&lt;&lt;rno;</b>         <b>puts(sname);</b>         <b>cout&lt;&lt;percent;</b>     } };</pre>	3

	Ans	<pre><b>void display()</b> { <b>student s;</b> <b>ifstream i("stud.dat");</b> <b>while(i.read((char*)&amp;s,sizeof(s)))</b> { <b>if(s.retpercent()&gt;=75)</b> <b>s.showdetails();</b> } <b>i.close();</b> }  (<b>½ Mark for opening stud.dat correctly</b>) (<b>1 Mark for reading all records from the file</b>) (<b>1 Mark for comparing desired value with obtained data</b>) (<b>½ Mark for calling showdetails() function</b>)</pre>	
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### Section - B (Python)

1	(a)	<p>Carefully observe the following python code and answer the questions that follow:</p> <pre>x=5 def func2():     x=3     global x     x=x+1     print x     print x</pre> <p>On execution the above code produces the following output.</p> <p>6 3</p> <p>Explain the output with respect to the scope of the variables.</p>	2
	Ans:	<p>Names declared with global keyword have to be referred at the file level. This is because the global statement indicates that the particular variable lives in the global scope. If no global statement is being used, the variable with the local scope is accessed.</p> <p>Hence, in the above code the statement succeeding the statement global x informs python to increment the global variable x</p> <p>Hence the output is 6 i.e 5+1 which is also the value for global x.</p>	

		<p>When x is reassigned with the value 3 the local x hides the global x and hence 3 is printed.</p> <p>(2 marks for explaining the output)</p> <p>(Only 1 mark for explaining global and local namespace.)</p>	
	(b)	<p>Name the modules to which the following functions belong:</p> <p>a. uniform()      b. fabs()</p>	1
	Ans:	<p>a. random() b. math()</p> <p>(½ mark each for the correct modules)</p>	
	(c)	<p>Rewrite the following code after removing the syntactical errors (if any). Underline each correction.</p> <pre><code>def checksum:     x= input("Enter a number")     if (x%2 = 0):         for i range(2*x):             print i     loop else:         print "#"</code></pre>	2
	Ans:	<pre><code><u>def checksum():</u>     x= input("Enter a number")     <u>if (x%2 == 0):</u>         <u>for i in range(2*x):</u>             print i     <u>else:</u>         print "#"</code></pre> <p>(½ mark for each correction) (1 mark to be given if only the errors are identified)</p>	
	(d)	<p>Observe the following Python code carefully and obtain the output, which will appear on the screen after execution of it.</p>	2

		<pre> def Findoutput():     L = "earn"     X=""     L1=[]     count = 1     for i in L:         if i in['a','e','i','o','u']:             X=X+i.swapcase()         else:             if (count%2!=0):                 X= X+str(len(L[:count]))             else:                 X = X+i         count = count+1     print X Findoutput() </pre>	
	Ans:	EA3n (½ mark for each correct character of the output)	
	(e)	What output will be generated when the following Python code is executed? <pre> def ChangeList():     L=[]     L1=[]     L2=[]     for i in range(1,10):         L.append(i)     for i in range(10,1,-2):         L1.append(i)     for i in range(len(L1)):         L2.append(L1[i]+L[i])     L2.append(len(L)-len(L1))     print L2 ChangeList() </pre>	3
	Ans:	[11, 10, 9, 8, 7, 4]  (½ mark for each correct value) (Deduct ½ mark if output not displayed as a list i.e. missing [])	
	(f)	Observe the following program and answer the questions that follow: <pre> import random X=3 N = random.randint(1,X) for i in range(N):     print i,'#',i+1 </pre> <p>a. What is the minimum and maximum number of times the loop will execute?</p>	2

		<p>b. Find out, which line of output(s) out of (i) to (iv) will not be expected from the program?</p> <p>I. 0#1 ii. 1#2 iii. 2#3 iv. 3#4</p>	
	Ans:	<p>a. Minimum Number = 1 Maximum Number = 3</p> <p>b. Line iv is not expected to be a part of the output.</p> <p>( 1 mark for correct Minimum and Maximum value) ( 1 mark for identifying iv as the answer)</p>	
2	a	Explain the two strategies employed by Python for memory allocation.	2
	Ans:	<p>Python uses two strategies for memory allocation-</p> <p>i. Reference counting ii. Automatic garbage collection.</p> <p><b>Reference Counting:</b> works by counting the number of times an object is referenced by other objects in the system. When an object's reference count reaches zero, Python collects it automatically.</p> <p><b>Automatic Garbage Collection:</b> Python schedules garbage collection based upon a threshold of object allocations and object deallocations. When the number of allocations minus the number of deallocations are greater than the threshold number, the garbage collector is run and the unused block of memory is reclaimed.</p> <p>(1 mark for writing the names of both the strategies) (1 mark for explaining any one strategy) (2 mark for explaining both the strategies)</p>	
	b	Observe the following class definition and answer the questions that follow:	2

	<pre> class Info:     ips=0     def __str__(self): #Function 1         return " Welcome to the Info Systems"     def __init__(self):         self.__Systemdate=""         self.SystemTime=""     def getinput(self):         self.__Systemdate = raw_input("enter data")         self.SystemTime=raw_input("enter data")         Info.incrips()     @staticmethod #Statement 1     def increps():         Info.ips=Info.ips+1         print " System invoked",Info.ips,"times" I=Info() I.getinput() print I.SystemTime print I.__Systemdate # Statement 2 </pre> <p>i. Write statement to invoke Function 1.</p> <p>ii. On Executing the above code , Statement 2 is giving an error explain.</p>	
Ans:	<p>i. print I</p> <p>ii. The statement 2 is giving an error because __Systemdate is a private variable and hence cannot be printed outside the class.</p> <p>(1 mark for correct answer of i.)</p> <p>(½ mark for identifying __Systemdate as private variable and ½ mark for correct explanation)</p>	
c	<p>Define a class PRODUCT in Python with the following specifications</p> <p>Data members:</p> <p>Pid – A string to store productid.</p> <p>Pname - A string to store the name of the product.</p> <p>Pcostprice – A decimal to store the cost price of the product</p> <p>Psellingprice – A decimal to store Selling Price</p> <p>Margin - A decimal to be calculated as Psellingprice - Pcostprice</p> <p>Remarks - To store "Profit" if Margin is positive else "Loss" if Margin is negative</p> <p>Member Functions:</p>	4

	<ul style="list-style-type: none"> <li>• A constructor function to initialize All the data members with valid default values.</li> <li>• A method SetRemarks() that assigns Margin as Psellingprice - Pcostprice and sets Remarks as mentioned below:</li> </ul> <table border="1"> <thead> <tr> <th><u>Margin</u></th><th><u>Remarks</u></th></tr> </thead> <tbody> <tr> <td>&lt;0 ( negative)</td><td>Loss</td></tr> <tr> <td>&gt;0(positive)</td><td>Profit</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>• A method Getdetails() to accept values for Pid,Pname,Pcostprice,Psellingprice and invokes SetRemarks() method.</li> <li>• A method Setdetails() that displays all the data members.</li> </ul>	<u>Margin</u>	<u>Remarks</u>	<0 ( negative)	Loss	>0(positive)	Profit	
<u>Margin</u>	<u>Remarks</u>							
<0 ( negative)	Loss							
>0(positive)	Profit							
	<p>Ans:</p> <pre>class PRODUCT:     def __init__(self):         self.Pid = ""         self.Pname = ""         self.Pcostprice = 0.0         self.Psellingprice = 0.0         self.Margin = 0.0         self.Remarks = ""     def SetRemarks(self):         self.Margin = self.Psellingprice - self.Pcostprice         if (self.Margin &lt;0):             self.Remarks="Loss"         else:             self.Remarks="Profit"     def Getdetails(self):         self.Pid = raw_input("Enter Product Id")         self.Pname = raw_input("Enter Product Name")         self.Pcostprice = input("Enter Cost Price")         self.Psellingprice =input("Enter Selling Price")         self.SetRemarks()      def Setdetails(self):         print "Product Id" ,self.Pid         print "Product Name", self.Pname         print "Cost Price",self.Pcostprice         print "Selling Price",self.Psellingprice         print " Margin:",self.Margin         print "Incurred:",self.Remarks</pre>							

		(½ mark for correct syntax of class) (1 mark for correct __init__() method ) ( 1 mark for correct definition of SetRemarks()) (1 mark for correct definition of Getdetails() ) (½ mark for correct definition of Setdetails() )	
	d	Answer the questions (i) to (iv) based on the following: <pre>class Shop(object):     def __init__(self):         self.no_of_employees =0         self.no_of_brands=0     def getSdata(self):         self.no_of_employees=input("Number of employees")         self.no_of_brands=input("Number of brands")     def showSdata(self):         print self.no_of_employees         print self.no_of_brands class Brand (object):     def __init__(self):         self.name = ""         self.category=["Mens","Womens","Kids"]         self.avgprice=0.0     def getdata(self):         self.name = raw_input("Enter Brand Name")         self.avgprice = input("Enter Average Price")     def showdata(self):         print self.name         print self.category         print self.avgprice  class Mall(Brand,Shop):     def __init__(self):         self.no_of_shops =0     def getdata(self):         super(Mall,self).getSdata()      # Statement1         super(Mall,self).getdata()      # Statement 2         self.no_of_shops = input("Enter number of shops")     def showdata(self):         print self.no_of_shops         print self.no_of_brands         _____         # Blank 1</pre>	4
		i. Which type of Inheritance is demonstrated in the above code?	

		ii. Explain Statement 1 and 2.	
		iii. Name the methods that are overridden along with their class name.	
		iv. Fill Blank1 with a statement to display variable category of class Brand.	
	Ans:	<p>i. Multiple Inheritance (1 mark for the correct answer)</p> <p>ii. Statement 1 and 2 invoke the getSdata() function of class Shop and getData() function of class Brand respectively. (1 mark for the correct answer)</p> <p>iii. getData() method of class Brand is overridden. When object of class Mall is created,  <math>M = \text{Mall}()</math>  <math>M.getData()</math>      getData() method of class Mall is invoked and not of class Brand is called. (1 mark for the correct answer)</p> <p>iv. print Brand().category (1 mark for the correct answer)</p>	
3	a	<p>Consider the following unsorted list 95 79 19 43 52 3</p> <p>Write the passes of bubble sort for sorting the list in ascending order till the 3rd iteration.</p>	3
	Ans:	<p>[79, 19, 43, 52, 3, 95]  [19, 43, 52, 3, 79, 95]  [19, 43, 3, 52, 79, 95]</p> <p>(1 mark for each correct iteration in sequence.)</p>	
	b	Kritika was asked to accept a list of even numbers but she did not put	3

		<p>the relevant condition while accepting the list of numbers. You are required to write a user defined function oddtoeven(L) that accepts the List L as an argument and convert all the odd numbers into even by multiplying them by 2 .</p>	
	Ans:	<pre>def oddtoeven(L):     for i in range(len(L)):         if (L[i]%2!=0):             L[i] = L[i]*2</pre> <p>(1 mark for the correct loop)  (1 mark for the correct condition)  (1 mark for converting the number to even)</p>	
	c	<p>Aastha wants to create a program that accepts a string and <u>display the characters in the reverse order in the same line using a Stack</u>. She has created the following code , help her by completing the definitions on the basis of requirements given below :</p> <pre>class mystack:     def __init__(self):         self.mystr= _____ # Accept a string         self.mylist = _____ # Convert mystr to a list     # Write code to display while removing element from the stack.      def display(self):         :         :</pre>	4
	Ans:	<pre>class mystack:     def __init__(self):         self.mystr= raw_input("Enter the string")         self.mylist = list(self.mystr)      def display(self):         x= len(self.mylist)         if (x&gt;0):             for i in range(x):                 print self.mylist.pop(),         else:             print "Stack is empty"</pre> <p>(½ mark for accepting the string)</p>	

		(1 mark for converting the string to list) (1 mark for checking whether the stack is empty) (½ mark for the correct loop) ( 1 mark for the correct use of pop() method)																																	
	d	Write a generator function generatesq() that displays the squareroots of numbers from 100 to n where n is passed as an argument .	2																																
	Ans:	<pre>import math def generatesq(n):     for i in range(100,n):         yield(math.sqrt(i))</pre> (½ mark for import math) (½ correct use of sqrt() function) (1 mark for yield())																																	
	e	Evaluate the following Postfix expression:  20,10,-,15,3,/,+,*	2																																
		<table border="1"> <thead> <tr> <th>Symbol</th> <th>Operation</th> <th>Stack</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>Push</td> <td>20</td> <td></td> </tr> <tr> <td>10</td> <td>Push</td> <td>20,10</td> <td></td> </tr> <tr> <td>-</td> <td>Pop(10) Pop(20) Push(20-10) =10</td> <td>10</td> <td></td> </tr> <tr> <td>15</td> <td>Push</td> <td>10,15</td> <td></td> </tr> <tr> <td>3</td> <td>Push</td> <td>10,15,3</td> <td></td> </tr> <tr> <td>/</td> <td>Pop(3) Pop(15) Push(15/3)=5</td> <td>10,5</td> <td></td> </tr> <tr> <td>+</td> <td>Pop(5) Pop(10) Push(10+5)=15</td> <td>15</td> <td></td> </tr> </tbody> </table>	Symbol	Operation	Stack	Result	20	Push	20		10	Push	20,10		-	Pop(10) Pop(20) Push(20-10) =10	10		15	Push	10,15		3	Push	10,15,3		/	Pop(3) Pop(15) Push(15/3)=5	10,5		+	Pop(5) Pop(10) Push(10+5)=15	15		
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5	Push	15,5									
*	Pop(5) Pop(15) Push(15*5)=5	75	75								
		<p>(½ mark for correct stack status till ‘-’)</p> <p>(½ mark for correct stack status till ‘/’)</p> <p>(½ mark for correct stack status till ‘+’)</p> <p>(½ mark for correct stack status till ‘*’)</p> <p>(½ mark for writing the correct result without working of Stack)</p>									
4	a	<p>Observe the following code and answer the questions that follow:</p> <pre>File = open("Mydata", "a") _____ #Blank1 File.close()</pre> <p>i. What type (Text/Binary) of file is Mydata?</p> <p>ii. Fill the Blank 1 with statement to write “ABC” in the file “Mydata”</p>	1								
	Ans:	<p>i. Text File  <i>(½ mark for the correct answer)</i></p> <p>ii. File.write("ABC")  <i>(½ mark for the correct statement)</i></p>									
	b	<p>A text file “Quotes.Txt” has the following data written in it:</p> <p>Living a life you can be proud of      Doing your best      Spending your time with people and activities that are important to you      Standing up for things that are right even when it’s hard      Becoming the best version of you</p> <p>Write a user defined function to display the total number of words</p>	2								

		present in the file.	
	Ans:	<pre>def countwords():     S= open("Mydata", "r")     f = S.read()     z= f.split()     count = 0     for i in z:         count = count+1     print "Total number of words",count</pre> <p>(½ mark for reading the file using read)  (½ mark for correctly using split())  (½ mark for the correct loop)  (½ mark for displaying the correct value of count)</p>	
	c	<p>Consider the following class declaration and answer the question that follows:</p> <pre>import pickle class Student:     def __init__(self):         self.name=""         self.percent=0.0     def inputdata(self):         self.name=raw_input("Enter Name")         self.percent=input("Enter Percentage scored")     def returnpercent(self):         return (self.percent)     def displaydata(self):         print "Name:",self.name         print "Percent:",self.percent</pre> <p>A</p> <p>nuj has been asked to display all the students who have scored less than 40 for Remedial Classes.</p> <p>Write a user defined function to display all those students who have scored less than 40 from the binary file “Student.dat” assuming it stores all the object of the class Student mentioned above.</p>	3

	Ans:	<pre> def displaydata():     X=open("student.dat", "rb")     S = Student()     try:         while (X):             S=pickle.load(X)             if (S.returnpercent()&lt;40):                 S.displaydata()     except EOFError:         pass      X.close() </pre> <p>(½ Mark for opening the file in “rb” mode)  (½ Mark for creating the object of the class student)  (½ Mark for the loop)  (½ Mark for loading the object from the file)  (½ Mark for calling returnpercent()to check percentage&lt;40 )  (½ Mark for displaying records)</p>	
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### Section – C

5	(a)	<p>Observe the table ‘Club’ given below:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;"><b>Club</b></th></tr> <tr> <th style="width: 15%;">Member_id</th><th style="width: 25%;">Member_Name</th><th style="width: 20%;">Address</th><th style="width: 15%;">Age</th><th style="width: 15%;">Fee</th></tr> </thead> <tbody> <tr> <td>M001</td><td>Sumit</td><td>New Delhi</td><td>20</td><td>2000</td></tr> <tr> <td>M002</td><td>Nisha</td><td>Gurgaon</td><td>19</td><td>3500</td></tr> <tr> <td>M003</td><td>Niharika</td><td>New Delhi</td><td>21</td><td>2100</td></tr> <tr> <td>M004</td><td>Sachin</td><td>Faridabad</td><td>18</td><td>3500</td></tr> </tbody> </table> <p>i. What is the cardinality and degree of the above given table?  ii. If a new column contact_no has been added and three more members have joined the club then how these changes will affect the degree and cardinality of the above given table.</p>	<b>Club</b>					Member_id	Member_Name	Address	Age	Fee	M001	Sumit	New Delhi	20	2000	M002	Nisha	Gurgaon	19	3500	M003	Niharika	New Delhi	21	2100	M004	Sachin	Faridabad	18	3500	2
<b>Club</b>																																	
Member_id	Member_Name	Address	Age	Fee																													
M001	Sumit	New Delhi	20	2000																													
M002	Nisha	Gurgaon	19	3500																													
M003	Niharika	New Delhi	21	2100																													
M004	Sachin	Faridabad	18	3500																													
	Ans	<p>i. Cardinality: 4  Degree: 5  <b>(½ Mark for each correct answer)</b></p> <p>ii. Cardinality: 7  Degree: 6  <b>(½ Mark for each correct answer)</b></p>																															

	(b)	<p>Write SQL commands for the queries (i) to (iv) and output for (v) to (viii) based on the tables ‘Watches’ and Sale given below.</p> <p><b>Watches</b></p> <table border="1"> <thead> <tr> <th>Watchid</th><th>Watch_Name</th><th>Price</th><th>Type</th><th>Qty_Store</th></tr> </thead> <tbody> <tr> <td>W001</td><td>HighTime</td><td>10000</td><td>Unisex</td><td>100</td></tr> <tr> <td>W002</td><td>LifeTime</td><td>15000</td><td>Ladies</td><td>150</td></tr> <tr> <td>W003</td><td>Wave</td><td>20000</td><td>Gents</td><td>200</td></tr> <tr> <td>W004</td><td>HighFashion</td><td>7000</td><td>Unisex</td><td>250</td></tr> <tr> <td>W005</td><td>GoldenTime</td><td>25000</td><td>Gents</td><td>100</td></tr> </tbody> </table> <p><b>Sale</b></p> <table border="1"> <thead> <tr> <th>Watchid</th><th>Qty_Sold</th><th>Quarter</th></tr> </thead> <tbody> <tr> <td>W001</td><td>10</td><td>1</td></tr> <tr> <td>W003</td><td>5</td><td>1</td></tr> <tr> <td>W002</td><td>20</td><td>2</td></tr> <tr> <td>W003</td><td>10</td><td>2</td></tr> <tr> <td>W001</td><td>15</td><td>3</td></tr> <tr> <td>W002</td><td>20</td><td>3</td></tr> <tr> <td>W005</td><td>10</td><td>3</td></tr> <tr> <td>W003</td><td>15</td><td>4</td></tr> </tbody> </table> <p>i. To display all the details of those watches whose name ends with ‘Time’</p> <p>ii. To display watch’s name and price of those watches which have price range in between 5000-15000.</p> <p>iii. To display total quantity in store of Unisex type watches.</p> <p>iv. To display watch name and their quantity sold in first quarter.</p> <p>v. select max(price), min(qty_store) from watches;</p> <p>vi. select quarter, sum(qty_sold) from sale group by quarter;</p> <p>vii. select watch_name,price,type from watches w, sale s where w.watchid!=s.watchid;</p> <p>viii. select watch_name, qty_store, sum(qty_sold), qty_store - sum(qty_sold) “Stock” from watches w, sale s where w.watchid=s.watchid group by s.watchid;</p>	Watchid	Watch_Name	Price	Type	Qty_Store	W001	HighTime	10000	Unisex	100	W002	LifeTime	15000	Ladies	150	W003	Wave	20000	Gents	200	W004	HighFashion	7000	Unisex	250	W005	GoldenTime	25000	Gents	100	Watchid	Qty_Sold	Quarter	W001	10	1	W003	5	1	W002	20	2	W003	10	2	W001	15	3	W002	20	3	W005	10	3	W003	15	4	6
Watchid	Watch_Name	Price	Type	Qty_Store																																																								
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W001	15	3																																																										
W002	20	3																																																										
W005	10	3																																																										
W003	15	4																																																										
	Ans	<b>i. select * from watches where watch_name like ‘%Time’</b>																																																										

( $\frac{1}{2}$  mark for SELECT query)  
( $\frac{1}{2}$  mark for where clause)

ii. select watch\_name, price from watches where price between 5000 and 15000;

( $\frac{1}{2}$  mark for SELECT query)  
( $\frac{1}{2}$  mark for where clause)

iii. select sum(qty\_store) from watches where type like 'Unisex';

( $\frac{1}{2}$  mark for SELECT query)  
( $\frac{1}{2}$  mark for where clause)

iv. select watch\_name,qty\_sold from watches w,sale s where w.watchid=s.watchid and quarter=1;

( $\frac{1}{2}$  mark for SELECT query)  
( $\frac{1}{2}$  mark for where clause)

v.

max(price)	min(qty_store)
25000	100

( $\frac{1}{2}$  mark for correct output)

vi.

quarter	sum(qty_sold)
1	15
2	30
3	45
4	15

( $\frac{1}{2}$  mark for correct output)

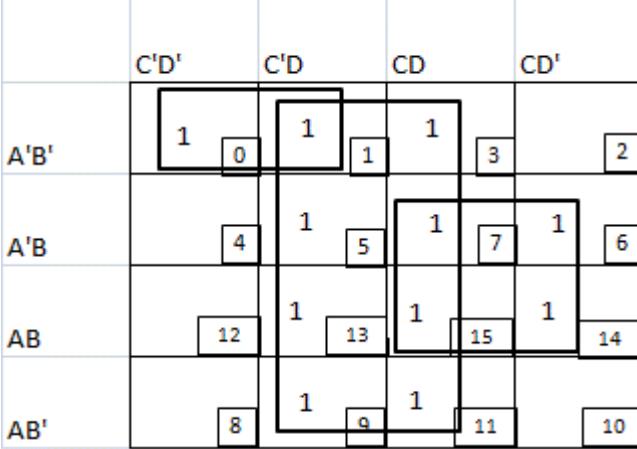
vii.

watch_name	price	type
HighFashion	7000	Unisex

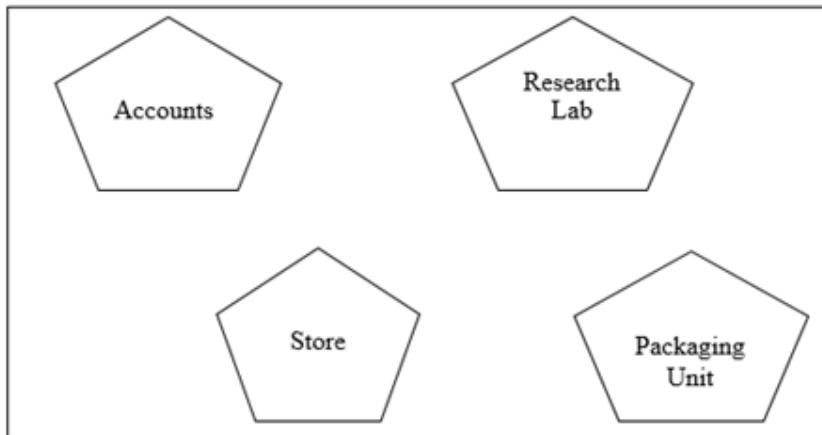
( $\frac{1}{2}$  mark for correct output)

viii.

		<table border="1"> <thead> <tr> <th><b>watch_name</b></th><th><b>qty_store</b></th><th><b>qty_sold</b></th><th><b>Stock</b></th></tr> </thead> <tbody> <tr> <td><b>HighTime</b></td><td><b>100</b></td><td><b>25</b></td><td><b>75</b></td></tr> <tr> <td><b>LifeTime</b></td><td><b>150</b></td><td><b>40</b></td><td><b>110</b></td></tr> <tr> <td><b>Wave</b></td><td><b>200</b></td><td><b>30</b></td><td><b>170</b></td></tr> <tr> <td><b>GoldenTime</b></td><td><b>100</b></td><td><b>10</b></td><td><b>90</b></td></tr> </tbody> </table> <p>(½ mark for correct output)</p>	<b>watch_name</b>	<b>qty_store</b>	<b>qty_sold</b>	<b>Stock</b>	<b>HighTime</b>	<b>100</b>	<b>25</b>	<b>75</b>	<b>LifeTime</b>	<b>150</b>	<b>40</b>	<b>110</b>	<b>Wave</b>	<b>200</b>	<b>30</b>	<b>170</b>	<b>GoldenTime</b>	<b>100</b>	<b>10</b>	<b>90</b>	
<b>watch_name</b>	<b>qty_store</b>	<b>qty_sold</b>	<b>Stock</b>																				
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<b>GoldenTime</b>	<b>100</b>	<b>10</b>	<b>90</b>																				
6	(a)	<p>Correct the following boolean statements:</p> <ol style="list-style-type: none"> <li>1. <math>X+1 = X</math></li> <li>2. <math>(A')' = A'</math></li> <li>3. <math>A+A'=0</math></li> <li>4. <math>(A+B)' = A.B</math></li> </ol>	2																				
	Ans:	<ol style="list-style-type: none"> <li>1. <math>X+1 = 1</math> or <math>X+0=X</math></li> <li>2. <math>((A')') = A</math></li> <li>3. <math>A + A' = 1</math> or <math>A . A' = 0</math></li> <li>4. <math>(A+B)' = A' . B'</math></li> </ol> <p>(½ mark for each corrected statement)</p>																					
	(b)	<p>Draw the equivalent logic circuit for the following Boolean expression:</p> $(A.B)+C$	1																				
	Ans:	<pre> graph LR     A((A)) --&gt; AND[AND]     B((B)) --&gt; AND     AND --&gt; OR[OR]     C((C)) --&gt; OR     OR --&gt; C_out((C))     </pre> <p>(½ mark for correct placement of each gate)</p>																					
	(c)	<p>Write the POS form of a Boolean Function F, which is represented in a truth table as follows:</p> <table border="1"> <thead> <tr> <th>P</th> <th>Q</th> <th>R</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	P	Q	R	F	0	0	0	0	0	0	1	1	2								
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0	0	0	0																				
0	0	1	1																				

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	Ans:	$(P+Q+R).(P'+Q+R).(P'+Q'+R)$ (½ mark each for correct maxterms) (½ mark for the correct representation as POS)																									
	(d)	Reduce the following Boolean Expression using K Map: $F(A,B,C,D) = \Sigma(0,1,3,5,6,7,9,11,13,14,15)$	3																								
	Ans:	 $A'B'C' + D + BC$ (½ mark for correct K MAP format) (½ mark for putting 1 at the right place) (½ mark for each correct groups) (½ mark for the correct answer)																									
7	(a)	Identify the type of topology on the basis of the following: <ol style="list-style-type: none"> <li>Since every node is directly connected to the server, a large amount of cable is needed which increases the installation cost of the network.</li> <li>It has a single common data path connecting all the nodes.</li> </ol>	2																								

	Ans:	a. Star Topology b. Bus Topology  (1 mark for each correct answer)	
	(b)	Expand the following: a. VOIP b. SMTP	1
	Ans:	a. Voice Over Internet Protocol b. Simple Mail Transfer Protocol (½ mark for each correct answer)	
	(c)	Who is a hacker?	1
	Ans:	A computer enthusiast, who uses his computer programming skills to intentionally access a computer without authorization is known as hacker. A hacker accesses the computer without the intention of destroying data or maliciously harming the computer.  (1 mark for the correct answer)	
	(d)	The following is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points.  140.179.220.200  What is it? What is its importance?	1
	Ans:	It is an IP Address. It is used to identify the computers on a network.  (½ mark for identification) (½ mark for the importance)	
	(e)	Daniel has to share the data among various computers of his two offices branches situated in the same city. Name the network (out of LAN, WAN, PAN and MAN) which is being formed in this process.	1
	Ans	MAN  <i>(1 mark for correct answer)</i>	
	(f)	Rehana Medicos Center has set up its new center in Dubai. It has four buildings as shown in the diagram given below:	



Distances between various buildings are as follows:

Accounts to Research Lab	55 m
Accounts to Store	150 m
Store to Packaging Unit	160 m
Packaging Unit to Research Lab	60 m
Accounts to Packaging Unit	125 m
Store to Research Lab	180 m

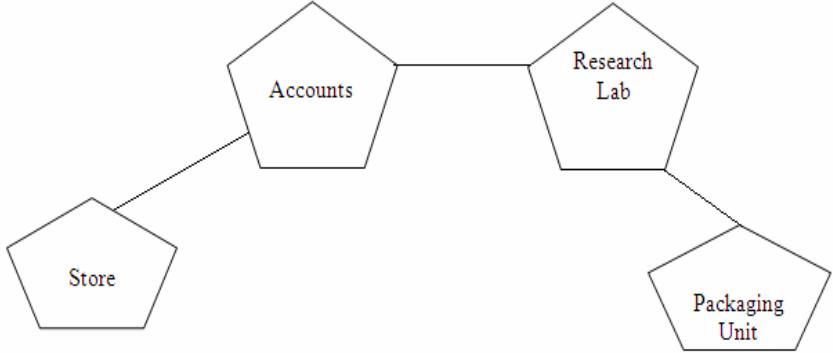
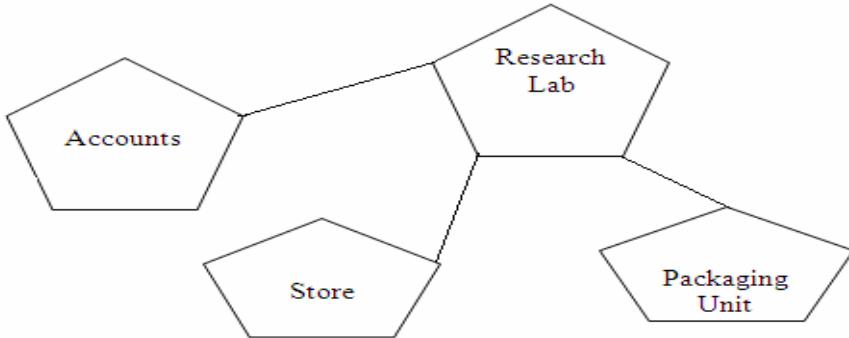
Number of Computers

Accounts	25
Research Lab	100
Store	15
Packaging Unit	60

As a network expert, provide the best possible answer for the following queries:

i) Suggest a cable layout of connections between the buildings.

ii) Suggest the most suitable place (i.e. buildings) to house the server of this organization.

		<p>iii) Suggest the placement of the following device with justification:      a) Repeater                      b) Hub/Switch</p> <p>iv) Suggest a system (hardware/software) to prevent unauthorized access to or from the network.</p>	
	Ans	<p>(i) Layout 1</p>  <p>Layout 2</p>  <p>(Any of the above)</p> <p><b>(1 mark for drawing correct layout)</b></p> <p>(ii)The most suitable place/ building to house the server of this organization would be building Research Lab, as this building contains the maximum number of computers.</p> <p><b>(1 mark for correct answer)</b></p>	

	<p>(iii)</p> <p>a) For layout1, since the cabling distance between Accounts to Store is quite large, so a repeater would ideally be needed along their path to avoid loss of signals during the course of data flow in this route. For layout2, since the cabling distance between Store to Recresearch Lab is quite large, so a repeater would ideally be placed.</p> <p>b) In both the layouts, a Hub/Switch each would be needed in all the buildings to interconnect the group of cables from the different computers in each building.</p> <p><b>(½ mark for each correct answer)</b></p> <p>(iv) Firewall</p> <p><b>(1 mark for correct answer)</b></p>	
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## **Sample Question Paper – Set II**

### **Computer Science (083)**

### **Class- XII (2015-16)**

**Time: 3hrs**

**M.M: 70**

#### **Instructions:**

- i. All Questions are Compulsory.
- ii. Programming Language: Section A : C++
- iii. Programming Language: Section B: Python
- iv. Answer either Section A or B, and Section C is compulsory

#### **Section : A (C++)**

Q1 a. Define Macro with suitable example. 2

b. Which C++ header file (s) will be included to run /execute the following C++ code? 1

```
void main()
{
    int Last =26.5698742658;
    cout<<setw(5)<<setprecision(9)<<Last; }
```

c. Rewrite the following program after removing any syntactical errors. Underline each correction made. 2

```
#include<iostream.h>

void main( )
{
    int A[10];
    A=[3,2,5,4,7,9,10];
    for( p = 0; p<=6; p++)
    {
        if(A[p]%2=0)
            int S = S+A[p];
        cout<<S;
    }
}
```

d. Find the output of the following C++ program: 2

```
#include<iostream.h>

void repch(char s[])
```

```

{
for (int i=0;s[i]!='\0';i++)
{
    if(((i%2)!=0) &&(s[i]!=s[i+1]))
    {
        s[i]='@';
    }
    else if (s[i]==s[i+1])
    {
        s[i+1] ='!';
        i++;
    }
}
}

void main()
{
    char str[]="SUCCESS";
    cout<<"Original String"<<str
    repch(str);
    cout<<"Changed String"<<str;
}

```

e. Find the output of the following :

3

```

#include<iostream.h>
void switchover(int A[ ],int N, int split)
{
    for(int K = 0; K<N; K++)
        if(K<split)
            A[K] += K;
        else
            A[K]*= K;
}

```

```

void display(int A[ ],int N)
{
    for(int K = 0; K<N; K++)
        (K%2== 0) ?cout<<A[K]<<"%" : cout<<A[K]<<endl;
}
void main( )
{
    int H[ ] = {30,40,50,20,10,5};
    switchover(H,6,3);
    display(H,6);
}

```

f. Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output.Also assign the maximum and minimum value that can be assigned to the variable ‘Go’.

```

void main()
{
    int X [4] ={100,75,10,125};
    int Go = random(2)+2;
    for (int i = Go; i< 4; i++)
        cout<<X[i]<<"$$";
}

```

- i. 100\$\$75      ii. 75\$\$10\$\$125\$\$      iii. 75\$\$10\$\$      iv.10\$\$125\$

Q2a. Differentiate between data abstraction and data hiding.                  2

b. Answer the questions (i) and (ii) after going through the following class :

```

class Exam
{
    int Rollno;
    char Cname[25];
    float Marks ;
public :
    Exam( )            //Function 1
    {
        Rollno = 0 ;
        Cname=""; 
        Marks=0.0;
    }
}

```

```

}

Exam(int Rno, char candname)      //Function 2

{
    Rollno = Rno ;
    strcpy(Cname,candname);

}

~Exam()                         //Function 3

{
    cout << "Result will be intimated shortly" << endl ;
}

void Display( )                  //Function 4

{
    cout << "Roll no :" << Rollno;
    cout << "Name :" << Cname;
    cout << " Marks:" << Marks;
}
};


```

(i) Which OOP concept does Function 1 and Function 2 implement. Explain?

(ii) What is Function 3 called? When will it be invoked?

c. Define a class **Candidate** in C++ with the following specification : 4

**Private Members :**

A data members Rno(Registration Number) type long

A data member Cname of type string

A data members Agg\_marks (Aggregate Marks) of type float

A data members Grade of type char

A member function setGrade () to find the grade as per the aggregate marks obtained by the student. Equivalent aggregate marks range and the respective grade as shown below.

<u>Aggregate Marks</u>	<u>Grade</u>
$\geq 80$	A
Less than 80 and $\geq 65$	B

Less than 65 and $\geq 50$	C
Less than 50	D

**Public members:**

A constructor to assign default values to data members:  
Rno=0,Cname="N.A",Agg\_marks=0.0

A function Getdata() to allow users to enter values for Rno, Cname, Agg\_marks and call function setGrade() to find the grade.

A function dispResult() to allow user to view the content of all the data members.

d. Give the following class definition answer the question that is follow: 4

```
class University
```

```
{
```

```
    char name [20];
```

```
    protected :
```

```
    char vc[20];
```

```
    public :
```

```
        void estd();
```

```
        void inputdata();
```

```
        void outputdata();
```

```
}
```

```
class College : protected University
```

```
{      int regno;
```

```
      protected
```

```
      char principal()
```

```
    public :
```

```
        int no_of_students;
```

```
        void readdata();
```

```
        void dispdata ( );
```

```
};
```

```
class Department : public College
```

```
    char name[20];
```

```

        char HOD[20];

    public :
        void fetchdata(int);
        void displaydata( );
    }

```

i). Name the base class and derived class of college. 1

ii) Name the data member(s) that can be accessed from function displaydata().

iii) What type of inheritance is depicted in the above class definition?

iv) What will be the size of an object (in bytes) of class Department?

Qs. 3a. An integer array A [30][40] is stored along the column in the memory. If the element A[20][25] is stored at 50000, find out the location of A[25][30]. 3

b. Write the definition of functions for the linked implemented queue containing passenger informationas follows: 4

```

struct NODE
{
    int Ticketno;
    char PName[20];
    NODE * NEXT;      };
}

class Queueofbus
{
    NODE *Rear, *Front;
public:
    Queueofbus()
    {
        Rear = NULL;
        Front = NULL;      };
    void Insert();
    void Delete();
    ~Queueofbus()
    {
        cout<<"Object destroyed";      }
};

}

```

c. Write a function to sort any array of n elements using insertion sort . Array should be passed as argument to the function. 3

d. Write a function NewMAT(int A[][],int r,int c ) in C++, which accepts a 2d array of integer and its size as parameters divide all those array elements by 6 which are not in the range 60 to 600(both values inclusive) in the 2d Array . 2

e.Evaluate the following postfix expression using stack and show the contents after execution of each Operations:470,5,4,^,25,/6,\* 2

Q4a.Consider a file F containing objects E of class Emp. 1

i)Write statement to position the file pointer to the end of the file

ii)Write statement to return the number of bytes from the beginning of the file to the current position of the file pointer.

b. Write a function RevText() to read a text file “ Input.txt “ and Print only word starting with ‘I’ in reverse order . 2

Example: If value in text file is: INDIA IS MY COUNTRY

Output will be: AIDNI SI MY COUNTRY

c. Write a function in C++ to search and display details, whose destination is “Chandigarh”from binary file “Flight.Dat”. Assuming the binary file is containing the objects of the following class: 3

```
class FLIGHT
{
    int Fno;           // Flight Number
    char From[20];    // Flight Starting Point
    char To[20];       // Flight Destination

public:
    char * GetFrom(); { return from; }
    char * GetTo();   { return To; }
    void input()     { cin>>Fno>>; gets(From); get(To); }
    void show()      { cout<<Fno<< ":" <<From << ":" <<To<<endl; }

};
```

## **Section : B (Python)**

Q1. a. List one similarity and one difference between List and Dictionary datatype 2

b. Observe the following Python functions and write the name(s) of the module(s) to which they belong:

- a. uniform()   b. findall()

c. Rewrite the following Python program after removing all the syntactical errors (if any), underlining each correction.: 2

```
def checkval:  
    x = raw_input("Enter a number")  
    if x % 2 = 0 :  
        print x,"is even"  
    else if x<0 :  
        print x,"should be positive"  
    else ;  
        print x,"is odd"
```

```
def checkval():  
    x = raw_input("Enter a number")  
    if x % 2 = 0 :  
        print x,"is even"  
elif x<0 :  
    print x,"should be positive"  
else :  
    print x,"is odd"
```

d. Find the output of the following Python program: 3

```
def makenew(mystr):  
    newstr = " "  
    count = 0  
    for i in mystr:  
        if count%2 !=0:  
            newstr = newstr+str(count)  
        else:  
            if islower(i):  
                newstr = newstr+upper(i)  
            else:  
                newstr = newstr+i
```

```

        count +=1

        newstr = newstr+mystr[:1]

        print "The new string is :",newstr

makenew("sTUdeNT")

```

e. Find the output of the following program 2

```

def calcresult () :

    i = 9

    while i> 1 :

        if (i % 2 == 0):

            x = i%2

            i = i-1

        else :

            i = i-2

            x = i

        print x**2

```

f. Observe the following Python code and find out , which out of the given options i) to iv) are the expected correct output(s).Also assign the maximum and minimum value that can be assigned to the variable ‘Go’.2

```

import random
X =[100,75,10,125]
Go = random.randint(0,3)
for i in range(Go):
    print X[i],"$",

```

- i. 100\$\$75\$\$10 ii. 75\$\$10\$\$125\$\$\$iii. 75\$\$10\$\$      iv.10\$\$125\$\$100

Q2 a. Discuss the strategies employed by python for memory allocation? 2

b. Answer the questions (i) and (ii) after going through the following class definition: 2

```

class Toy :

    tid =0;
    tcat = “ “

    def __init__(self):// Function1

```

..... // Blank 2

i. Explain relevance of Function 1.

ii. a. Fill in the blank2 with a statement to create object of the class TOY.

b. Write statement to check whether tprice is an attribute of class TOY.

c. Define a class Train in PYTHON with following description:

4

Data Members

src of type string

Tnm of type string

dest of type string

charges of float

• A member function Getdata to assign the following values for Charges

Dest	Charges
Mumbai	1000
Chennai	2000
Kolkatta	2500

Public members

- A constructor to initialize the data members.
- A function InputData() to allow the user to enter the values
- A function displaydata() to display all and call getdata function

d. Observe the following class definition and answer the question that follow:

2

```
class ParentClass(objects):
    def __init__(self)
        self.x = 1
        self.y = 10
    def print(self):
        print(self.x, self.y)
class ChildClass(ParentClass):
    def __init__(self):
        super(ChildClass, self).init_() # Line 1
        self.x = 2
        self.y = 20
c = ChildClass()
c.print()
```

a. Explain the relevance of Line1.

b. What type of inheritance is being demonstrated in the above code?

e. Write a user defined function findname(name) where name is an argument in Python to delete phone number from a dictionary phonebook on the basis of the name ,where name is the key.

2

Qs. 3a.Explain try..except...else ... with the help of user defined function def divide(x, y)which raises an error when the denominator is zero while dividing x by y and displays the quotient otherwise. 3

b. Write a user defined function arrangements(X), that accepts a list X of integers and sets all the negative elements to the left and all positive elements to the right of the list.

Eg: if L =[1,-2,3,4,-5,7] , the output should be: [-2,-5,3,4,7] 3

c. Consider the following class definition :- 3

class book ():

```
    bk = []  
  
    def __init__(self, bno):  
        self.bno = bno  
  
    def addbook(self):  
        .....  
  
    def removebook(self):  
        .....
```

The class book is implemented **using Queue**. Keeping the same in mind, complete the function definitions for adding a book addbook() and deleting a book removebook() .

d. Write a python function generatefibo(n) where n is the limit using a generator function Fibonacci (max) where max is the limit n that produces Fibonacci series.. 3

e. Evaluate the following postfix using stack & show the content of the stack after the execution of each: 20, 4, +, 3, -, 7, 1 2

Q4a. Consider the following code : 1

```
f = open ("mytry", "w+")
f.write ("0123456789abcdef")
f.seek (-3,2) //1
printf.read(2) //2
```

Explain statement 1 and give output of 2

b. Write a user defined function in Python that displays the number of lines starting with ‘H’ in the file Para.txt.Eg: if the file contains: 2

Whose woods these are I think I know.  
 His house is in the village though;  
 He will not see me stopping here  
 To watch his woods fill up with snow.

Then the line count should be 2.

- c. Consider a binary file Employee.dat containing details such as empno:ename:salary (separator ‘:’). Write a python function to display details of those employees who are earning between 20000 and 40000.(both values inclusive) 3

### Section : C

Q 5. a. Differentiate between cardinality and degree of a table with the help of an example. 2

b) Consider the following tables FACULTY and COURSES. Write SQL commands for the statements (i) to (v) and give outputs for SQL queries (vi) to (vii) 6

FACULTY

F_ID	Fname	Lname	Hire_date	Salary
102	Amit	Mishra	12-10-1998	12000
103	Nitin	Vyas	24-12-1994	8000
104	Rakshit	Soni	18-5-2001	14000
105	Rashmi	Malhotra	11-9-2004	11000
106	Sulekha	Srivastava	5-6-2006	10000

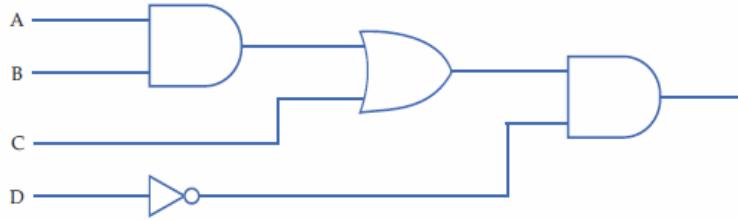
COURSES

C_ID	F_ID	Cname	Fees
C21	102	Grid Computing	40000
C22	106	System Design	16000
C23	104	Computer Security	8000
C24	106	Human Biology	15000
C25	102	Computer Network	20000
C26	105	Visual Basic	6000

- i) To display details of those Faculties whose salary is greater than 12000.
- ii) To display the details of courses whose fees is in the range of 15000 to 50000 (both values included).
- iii) To increase the fees of all courses by 500 of “System Design” Course.
- iv) To display details of those courses which are taught by ‘Sulekha’ in descending order of courses.
- v) Select COUNT(DISTINCT F\_ID) from COURSES;
- vi) Select MIN(Salary) from FACULTY,COURSES where COURSES.F\_ID = FACULTY.F\_ID;

Q6.a. State and Verify Absorption law algebraically. 2

b. Draw a logic circuit for the following Boolean expression: A.B+C.D’. 2



c. Write the SOP form of a Boolean function F, which is represented in a truth table as follows:

1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1

1	0	1	1
1	1	0	0
1	1	1	0

d. Obtain a simplified from for a Boolean expression:

3

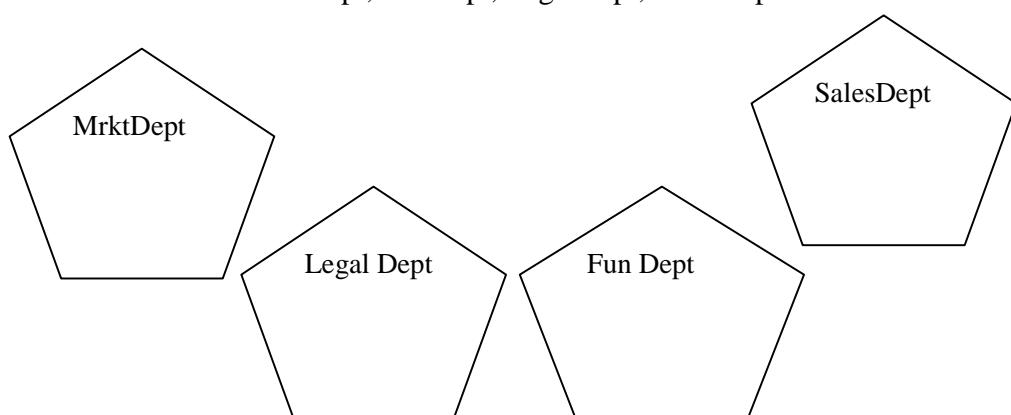
$$F(U, V, W, Z) = \Sigma(0, 1, 3, 5, 6, 7, 15)$$

Q 7.a Write any 1 advantage and 1 disadvantage of Bus topology.

1

b. SunRise Pvt. Ltd. is setting up the network in the Ahmadabad. There are four departments named as MrktDept, FunDept, LegalDept, SalesDept.

4



Distance between various buildings is given as follows:

MrktDept to FunDept	80 m
MrktDept to LegalDept	180m
MrktDept to SalesDept	100 m
LegalDept to SalesDept	150 m
LegalDept to FunDept	100 m
FunDept to SalesDept	50 m

Number of Computers in the buildings:

MrktDept	20
LegalDept	10
FunDept	08
SalesDept	42

- i) Suggest a cable layout of connections between the Departments and specify topology.
- ii) Suggest the most suitable building to place the server with a suitable reason.
- iii) Suggest the placement of i) modem ii) Hub /Switch in the network.
- iv) The organization is planning to link its sale counter situated in various part of the same city/ which type of network out of LAN, WAN, MAN will be formed? Justify.

- |   |   |
|---|---|
| c. Name the protocol  | 1 |
| i. Used to transfer voice using packet switched network.        |   |
| ii.Used for chatting between 2 groups or between 2 individuals. |   |
| d. What is an IP Address?                                       | 1 |
| e. What is HTTP?  | 1 |
| f. Explain the importance of Cookies.                           | 1 |
| g. How is 4G different from 3G?                                 | 1 |

## **Computer Science (083)**

### **Marking Scheme - Set - II**

### **Class- XII (2015-16)**

**Time: 3hrs**

**M.M: 70**

#### **Instructions:**

- i. All Questions are Compulsory.
- ii. Programming Language: Section A : C++
- iii. Programming Language: Section B: Python
- iv. Answer either Section A or B, and Section C is compulsory

#### **Section : A (C++)**

Q1 a. Define Macro with suitable example. 2

Ans: Macros are preprocessor directive created using # define that serve as symbolic constants. They are created to simplify and reduce the amount of repetitive coding  
For instance,

#define max (a, b) a>b? a: b

Defines the macro max, taking two arguments a and b. This macro may be called like any function. Therefore, after preprocessing

A = max(x, y);

Becomes A = x>y?x :y ;

[1 mark for definition]

[1 mark for example]

b. Which C++ header file (s) will be included to run /execute the following C++ code? 1

```
void main()
{
    int Last =26.5698742658;
    cout<<setw(5)<<setprecision(9)<<Last; }
```

Ans: iostream.h  
iomanip.h

[1/2 mark for each module name]

c. Rewrite the following program after removing any syntactical errors. Underline each correction made. 2

```
#include<iostream.h>

void main( )

    int A[10];

    A=[3,2,5,4,7,9,10];

    for( p = 0; p<=6; p++)

    {      if(A[p]%2=0)

            int S = S+A[p];      }

    cout<<S;      }
```

Ans :- #include<iostream.h>

```
void main( )

{      int A[10] = {3,2,5,4,7,9,10};

    int S = 0,p;

    for(p = 0; p<=6; p++)

    {      if(A[p]%2==0)

            S = S+A[p];      }

    cout<<S;

}
```

[1/2 mark for each correction]

d. Find the output of the following C++ program: 2

```
#include<iostream.h>

void repch(char s[])

{
```

```

for (int i=0;s[i]!='\0';i++)
{
    if(((i%2)!=0) &&(s[i]!=s[i+1]))
    {
        s[i]='@';
        cout<<"Hello";
    }
    else if (s[i]==s[i+1])
    {
        s[i+1]='!';
        i++;
    }
}
void main()
{
    char str[]="SUCCESS";
    cout<<"Original String"<<str;
    repch(str);
    cout<<"Changed String"<<str;
}

```

Ans:

Original String SUCCESS  
 Changed String S@C!ES!  
 [1/2 mark for original String]

[1/2 mark for ‘@’ in place of U ]

[1/2 mark for ‘!’ in place of second C ]

[1/2 mark for ‘!’ in place of second S ]

e. Find the output of the following :

3

```
#include<iostream.h>
void switchover(int A[ ],int N, int split)
{
    for(int K = 0; K<N; K++)
        if(K<split)
            A[K] += K;
        else
            A[K]*= K;
}
void display(int A[ ],int N)
{
    for(int K = 0; K<N; K++)
        (K%2== 0) ?cout<<A[K]<<"%" : cout<<A[K]<<endl;
}
void main( )
{
    int H[ ] = {30,40,50,20,10,5};
    switchover(H,6,3);
    display(H,6);
}
```

Ans 3: 30%41

52%60

40%25

[1/2 mark for each value in the above order]

[deduct ½ mark for not putting ‘%’ in between values]

f. Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output.Also assign the maximum and minimum value that can be assigned to the variable ‘Go’.

2

```
void main()
{
    int X [4] ={100,75,10,125};
    int Go = random(2)+2;
    for (int i = Go; i< 4; i++)
        cout<<X[i]<<"$$";
}
```

- i. 100\$\$75      ii. 75\$\$10\$\$125\$\$      iii. 75\$\$10\$\$    iv.10\$\$125\$

Ans : iv is the correct option.

Minimum value of Go = 2

Maximum value of Go = 3

[½ mark each for Minimum and Maximum value]

[1 mark for correct option]

Q2a. Differentiate between data abstraction and data hiding. 2

Ans : Data hiding can be defined as the mechanism of hiding the data of a class from the outside world. This is done to protect the data from any accidental or intentional access..

Data hiding is achieved by making the members of the class private.

Data abstraction refers to, providing only essential information to the outside world and hiding their background details.

Members defined with a public label are accessible to all parts of the program. The data-abstraction view of a type is defined by its public members.

[1/2 mark each for definition of Data Hiding and Data Abstraction]

[1/2 mark each for the difference in their implementation]

Or

[ 2 marks for explanation through an example.

b. Answer the questions (i) and (ii) after going through the following class :

2

```
class Exam
{
    int Rollno;
    char Cname[25];
    float Marks ;
    public :
        Exam( ) //Function 1
        {
            Rollno = 0 ;
            Cname = "" ;
            Marks = 0.0;
        }
        Exam(int Rno, char candname) //Function 2
        {
        }
```

```

        Rollno = Rno ;
        strcpy(Cname,candname);

    }

~Exam( )           //Function 3
{
    cout << "Result will be intimated shortly" << endl ;
}

void Display( )      //Function 4
{
    cout << "Roll no :" << Rollno;
    cout << "Name :" << Cname;
    cout << " Marks:" << Marks;
}

};


```

(i) Which OOP concept does Function 1 and Function 2 implement. Explain?

Ans: i. Constructor Overloading /Polymorphism , as multiple definitions for Constructors are given in the same scope. Function 1 is a Default constructor and function 2 is a Parameterized constructor.

[1/2 mark for the concept]

[1/2 mark for explanation]

(ii) What is Function 3 called? When will it be invoked?

ii. Function 3 is a Destructor which is invoked when the object goes out of scope.

[1/2 mark for identification]

[1/2 mark for time of invocation]

c. Define a class **Candidate** in C++ with the following specification :

**Private Members :**

A data members Rno(Registration Number) type long

A data member Cname of type string

A data members Agg\_marks (Aggregate Marks) of type float

A data members Grade of type char

A member function setGrade () to find the grade as per the aggregate marks obtained by the student. Equivalent aggregate marks range and the respective grade as shown below.

<u>Aggregate Marks</u>	<u>Grade</u>
>=80	A
Less than 80 and >=65	B
Less than 65 and >=50	C
Less than 50	D

#### **Public members:**

##### **A constructor to assign default values to data members:**

Rno=0,Cname="N.A",Agg\_marks=0.0

A function Getdata () to allow users to enter values for Rno, Cname, Agg\_marks and call function setGrade () to find the grade.

A function dispResult( ) to allow user to view the content of all the data members.

Ans : class Candidate

```
{ long Rno;
    char Cname[20];
    float Agg_marks;
    char Grade;
    void setGrade()
    { if (Agg_marks>= 80)
        Grade = 'A';
    else if(Agg_marks<80 && Agg_marks>=65)
        Grade = 'B';
    else if (Agg_marks<65 && Agg_marks>=50)
        Grade ='C';
    else
        Grade='D';
    }
public:
    Candidate()
    {
        Rno=0;
        Strcpy(Cname,"N.A.");
        Agg_marks=0.0;
    }

    void Getdata ()
    {
        cout<<"Registration No";
        cin>>Rno;
        cout<<"Name";
        cin>>Cname;
        cout<<Aggregate Marks",
```

```

        cin>>Agg_marks;
        setGrade();
    }

void dispResult()
{
    cout<<"Registration No"<<Rno;
    cout<<"Name"<<Cname;
    cout<<Aggregate Marks"<<Agg_marks;
}

```

[1/2 mark for correct syntax for class header]

[1/2 mark for correct declaration of data members]

[1/2 mark for correct definition of the constructor Candidate()]

[1 mark for correct definition of setGrade()]

[1mark for correct definition of Getdata () with proper invocation of setGrade()]]

[1/2 mark for correct definition of dispresult]

d. Give the following class definition answer the question that is follow: 4

```

class University

{
    char name [20];

    protected :

    char vc[20];

    public :

    void estd();

    void inputdata();

    void outputdata();

}

```

class College : protected University

```
{
    int regno;
```

```

protected

char principal()

public :

int no_of_students;

void readdata();

void dispdata ( );

};

class Department : public College

char name[20];

char HOD[20];

public :

void fetchdata(int);

void displaydata( );
}

```

i). Name the base class and derived class of college.

1

Ans: Base class: University

Derived class: Department

[1/2 mark for each correct class name]

ii) Name the data member(s) that can be accessed from function displaydata.

Ans: char name[20],char HOD[20], char principal(),int no\_of\_students, char vc[20]

[1 mark for each class]

iii)What type of inheritance is depicted in the above class definition?

Ans. Multilevel Inheritance

[1 mark for the correct answer]

iv) What will be the size of an object (in bytes) of class Department?

Ans: 85 bytes

[1 mark for the correct answer]

Qs. 3a. An integer array A [30][40] is stored along the column in the memory. If the element A[20][25] is stored at 50000, find out the location of A[25][30]. 3

Ans :  $A[i][j] = B + W \times [\text{No.of rows} \times (I-L_r) + (J-L_c)]$

$$A[20][25] = B + 2 \times [30 \times (20-0) + (25-0)]$$

$$50000 = B + 2 \times [30 \times (20-0) + (25-0)]$$

$$B = 48750$$

$$\begin{aligned} A[7][10] &= 48750 + 2 \times [30 \times (7-0) + (10-0)] \\ &= 49190 \end{aligned}$$

[1 mark for writing correct formula or substitution with correct values]

[1 mark for calculating correct base address.]

[1 mark for calculating correct address of A[7][10].]

b. Write the definition of functions for the linked implemented queue containing passenger informationas follows: 4

```
struct NODE
{
    int Ticketno;
    char PName[20];
    NODE * NEXT;      };
class Queueofbus
{
    NODE *Rear, *Front;
public:
    Queueofbus()
    {
        Rear = NULL;
        Front = NULL;      };
}
```

```

void Insert();
void Delete();
~Queueofbus()
{
    cout<<"Object destroyed";
}

```

Ans:

```

void Queueofbus::Insert()
{
    NODE *p = new NODE;
    cout<<"Enter Ticket no"
    cin>>p->ticketno;
    cout<<"Enter Name";
    cin>>p->Pname;
    p->NEXT = NULL;
    if (rear == NULL)
    {
        Rear = p;
        Front = Rear;
    }
    else
    {
        Rear -> NEXT = p;
        Rear = Rear -> NEXT;
    }
}

```

[1 mark for creating a node]

[1/2 mark for accepting details]

[1/2 mark for assigning NULL to NEXT pointer of the Node]

[1/2 mark for checking rear==NULL]

[1/2 mark for setting front and rear on the node when rear == NULL]

[1/2 mark for inserting the node at rear]

[1/2 for shifting rear to the new node]

- c. Write a function to sort any array of n elements using insertion sort . Array should be passed as argument to the function.

```

void insertsort( int a[],int n)
{
    int p,ptr;
    //Assuming a[0]=int_min i.e. smallest integer
    for(p=1;p<=n;p++)
    {
        temp=a[p];
        ptr=p-1;
        while(temp<a[ptr])
        {
            a[ptr+1]=a[ptr];           // Move Element Forward
            ptr--;
        }
        a[ptr+1]=temp;             // Insert Element in Proper Place
    }
}

```

[1/2 mark for correct for loop]

[1/2 mark for assigning first element to temp]

[1/2 mark for setting ptr = p-1]

[1/2 mark for correct while]

[1/2 mark for moving element forward]

[1/2 mark for inserting at the proper place]

d. Write a function NewMAT(int A[][],int r,int c ) in C++, which accepts a 2d array of integer and its size as parameters divide all those array elements by 6 which are not in the range 60 to 600 (both values inclusive) in the 2d Array . 2

Ans:

```
void NewMAT(int A[][],int r,int c )
```

```
{
```

```
for (int i = 0;i<r;i++)
```

```
    for(j=0;j<c;j++)
```

```

if ((A[i][j]>=60 )&&(A[i][j]<=600))

    A[i][j]/=6 ;
    or
    A[i][j] = A[i][j]/6;
}

```

[1 mark for correct loops]

[1/2 mark for the condition]

[1/2 mark for changing the element value by dividing it by 6]

e. Evaluate the following postfix expression using stack and show the contents after execution of each

Operations: 470, 5, 4, ^, 25, /, 6, \*

2

S.No.	Symbol	Operation	Stack	Result
1	470	push(470)	470	
2	5	push(5)	470,5	
3	4	push(4)	470,5,4	
4	^	pop(4)	470,5	
0		pop(5)	470	
		perform( $5^4$ )		
		push(625)	470,625	
5	25	push(25)	470,625,25	
6	/	pop(25)	470,625	
		pop(625)	470	
		perform( $625/25$ )	470	
		push(25)	470,25	
7	6	push(6)	470,25,6	
8	*	pop(6)	470,25	
		pop(25)	470	
		perform( $25*6$ )	470	

[1/2 mark for finding result upto '^' operator]

[1/2 mark for finding result upto '/' operator]

[1/2 mark for finding result upto '\*' operator]

[1/2 mark for correct answer]

[1/2 mark for only writing the answer]

Q4a) Consider a file F containing objects E of class Emp.

i) Write statement to position the file pointer to the end of the file

Ans: F.seekg(0,ios::end);

[1/2 mark for the statement]

ii) Write statement to return the number of bytes from the beginning of the file to the current position of the file pointer.

Ans: F.tellg();

[1/2 mark for the statement]

b) Write a function RevText() to read a text file “ Input.txt “ and Print only word starting with ‘I’ in reverse order . 2

Example: If value in text file is: INDIA IS MY COUNTRY

Output will be: AIDNI SI MY COUNTRY

Ans: void RevText()

```
{ ifstream in ("Input.txt");
    char word[25];
    while(in)
        { in>>word;

            if (word[0]==‘I’)
                cout<<strrev(word);
            else
                cout<<word;
        }
```

[1/2 mark for opening the file in input mode]

[1/2 mark for reading a word]

[1 mark for displaying words starting with ‘I’ in reverse order]

- c. Write a function in C++ to search and display details, whose destination is “Chandigarh” from binary file “Flight.Dat”. Assuming the binary file is containing the objects of the following class:

3

```
class FLIGHT

{    int Fno;           // Flight Number
    char From[20];      // Flight Starting Point
    char To[20];         // Flight Destination

public:
    char * GetFrom( );   { return from;   }
    char * GetTo( );     { return To;     }
    void input()          { cin>>Fno>>; gets(From); get(To);   }
    void show( )          { cout<<Fno<< ":"<<From << ":" <<To<<endl; }

};
```

```
Ans : void Dispdetails()
{
    ifstream fin("Flight.Dat");
    Flight F;
    while (fin)
    {
        fin.read((char*)&F,sizeof(F))
        if (strcmp(F.GetTo(),"Chandigarh"))
            F.show();
    }
}
```

[1/2 mark for opening the file in input mode]

[1/2 mark for creating the object of Flight]

[1 mark for reading the record in object of Flight]

[1/2 mark for comparing record's destination with 'Chandigarh']

[1/2 mark for displaying the record]

### Section : B (Python)

Q1. a. List one similarity and one difference between List and Dictionary datatype 2

Ans: Similarity : Both List and Dictionary are mutable datatypes.

Dissimilarity: List is a sequential data type i.e. they are indexed.

Dictionary is a mapping datatype. It consists of key: value pair.

Eg: L =[1,2,3,4,5] is a list

D= {1:"Ajay",2:"Prashant",4:"Himani"} is a dictionary where 1,2,4 are keys and "Ajay",Prashant,"Himani" are their corresponding values.

[1 mark for similarity]

[1 mark for any one point of dissimilarity]

or

[2 mark for explanation using example]

b. Observe the following Python functions and write the name(s) of the module(s) to which they belong: 1

- a. uniform()
- b. findall()

Ans: a. random b.re

[1/2 mark each for writing the correct module names]

c. Rewrite the following Python program after removing all the syntactical errors (if any),underlining each correction.: 2

```
def checkval:  
    x = raw_input("Enter a number")  
    if x % 2 = 0 :  
        print x,"is even"  
    else if x<0 :  
        print x,"should be positive"  
    else ;  
        print x,"is odd"
```

```
def checkval():  
    x = raw_input("Enter a number")
```

```

if x % 2 == 0 :
    print x,"is even"
elif x<0 :
    print x,"should be positive"
else :
    print x,"is odd"

```

[1/2 mark for each error]

d. Find the output of the following Python program:

3

```

def makenew(mystr):

    newstr = " "
    count = 0

    for i in mystr:

        if count%2 !=0:
            newstr = newstr+str(count)

        else:
            if islower(i):
                newstr = newstr+upper(i)

            else:
                newstr = newstr+i

        count +=1

    newstr = newstr+mystr[:1]

    print "The new string is :",newstr

makenew("sTUdeNT")

```

Ans: The new string is: S1U3E5Ts

[1/2 mark for each change i.e. S 1 3 E 5 s ]

e. Find the output of the following program

2

```

def calcresult () :
    i = 9
    while i > 1 :
        if (i % 2 == 0):
            x = i%2
            i = i-1
        else :
            i = i-2
            x = i
        print x**2

```

49  
25  
9  
1

[½ mark for each correct line of output.]  
 [Deduct ½ mark for showing output in same line]

f. Observe the following Python code and find out , which out of the given options i) to iv) are the expected correct output(s).Also assign the maximum and minimum value that can be assigned to the variable ‘Go’.

2

```

import random
X =[100,75,10,125]
Go = random.randint(0,3)
for i in range(Go):
    print X[i],"$",

```

- i. 100\$\$75\$\$10 ii. 75\$\$10\$\$125\$\$iii. 75\$\$10\$\$ iv.10\$\$125\$\$100

Solution :100 \$\$ 75 \$\$ 10 \$\$

Minimum Value that can be assigned to Go is 0  
 Maximum Value that can be assigned to Go is 3

[1 mark for correct option.]

[½ mark each for correct minimum and maximum value.]

Q2 a. Discuss the strategies employed by python for memory allocation? 2

Ans: Python uses two strategies for memory allocation- Reference counting and Automatic garbage collection:

**Reference Counting:** works by counting the number of times an object is referenced by other objects inthe system. When an object's reference count reaches zero, Python collects it automatically.

**Automatic Garbage Collection:** Python schedules garbage collection based upon a threshold of objectallocations and object de-allocations. When the number of allocations minus the number of deallocations are greater than the threshold number, the garbage collector is run and the unused block ofmemory is reclaimed.

[1 mark for naming the strategies]

[1 mark for explanation]

b. Answer the questions (i) and (ii) after going through the following class definition: 2

class Toy :

    tid =0;

    tcat = “ “

    def \_\_init\_\_(self):// Function1

..... // Blank 2

i. Explain relevance of Function 1.

ii. a. Fill in the blank2 with a statement to create object of the class TOY.

    b. Write statement to check whether tprice is an attribute of class TOY.

:i . \_\_init\_\_ function is used to initialize the members of a class. It is automatically invoked when the object of the class is created.

[1 mark for mentioning the relevance of \_\_init\_\_()]

ii.a. T=Toy()

    b. hasattr(T,tprice)

[1 mark for mentioning the relevance of \_\_init\_\_()]

[½ mark each for correct answer of ii.a. and ii.b.]

- c. Define a class Train in PYTHON with following description:  
Private Members

src of type string  
Tnm of type string  
dest of type string  
charges of float

- A member function Getdata to assign the following values for Charges

<u>Dest</u>	<u>Charges</u>
Mumbai	1000
Chennai	2000
Kolkatta	2500

Public members

- A parameterized constructor to initialize the data members.
- A function InputData() to allow the user to enter the values
- A function displaydata() to display all and call getdata function

Ans:

```
class train:
    def __init__(self):
        _src=""
        _tnm=""
        _dest=""
        _charges=0.0
    def getdata(self):
        if self._dest=="mumbai" or self._dest=="MUMBAI":
            self._charges=1000
        elif self._dest=="chennai" or self._dest=="CHENNAI":
            self._charges=2000
        elif self._dest=="kolkata" or self._dest=="KOLKATA":
            self._charges=2500
    def inputdata(self):
        self._src=raw_input("enter the source of journey")
        self._tnm=raw_input("enter the train name")
        self._dest=raw_input("enter the destination")
    def displaydata(self):
        print "the source of journey is",self._src
        print "the name of the train is",self._tnm
        print "the destination of the train is",self._dest
        t.getdata()
        print "the charges for your journey",self._charges
```

[ 1 mark for the correct syntax of class]

[1/2 mark for \_\_init\_\_()]

[1 mark for correct definition of getdata()]

[1/2 mark for correct definition of inputdata()  
[1 mark for correct definition of displaydata() with proper invocation of getdata()]

- d. Observe the following class definition and answer the question that follow: 2

```
class ParentClass(objects):
    def __init__(self)
        self.x = 1
        self.y = 10

    def print(self):
        print(self.x, self.y)
class ChildClass(ParentClass):
    def __init__(self):
        super(ChildClass, self).init_() # Line 1
        self.x = 2
        self.y = 20
c = ChildClass()
c.print()
```

a. Explain the relevance of Line1.

Ans: super() function is used to call the methods of base class which have been extended in derived class. Also it is the importance of derived class \_\_init\_\_() to invoke the base class \_\_init\_\_()

[1 mark for correct explanation]

b. What type of inheritance is being demonstrated in the above code?

Ans. Single level Inheritance

[1 mark for correct answer]

- e. Write a user defined function findname(name) where name is an argument in Python to delete phone number from a dictionary phonebook on the basis of the name ,where name is the key. 2

**Ans:**

```
def findname(name):
    if phonebook.has_key():
        del phonebook[name]
    else:
        print "Name not found"
    print "Phonebook Information"
```

```
print "Name","\t","Phone number"
for i in phonebook.keys():
    print i,'\t',phonebook[i]
[1/2 mark for checking whether the name is a valid key]
[1/2 mark for using del() to delete the corresponding entry]
[1/2 mark for the correct loop to display all the values corresponding to all keys]
[1/2 mark for displaying the phonebook values correctly]
```

Qs. 3a. Explain try..except...else ... with the help of user defined function def divide(x, y)which raises an error when the denominator is zero while dividing x by y and displays the quotient otherwise.

Ans: def divide(x, y):

```
try:
    result = x / y
except ZeroDivisionError:
    print "division by zero!"
else:
    print "result is", result
```

In the above example:

try block consists of code that can raise an error. When y(denominator) gets a 0 value, ZeroDivisionError is raised which is handled by except clause. In case of no exception else statement is executed.

In case there is no error the statement(s) in else clause are executed .  
[1/2 mark for correct try block]

[1 mark for handling zero division error using except clause]

[1/2 mark for else clause]

[1 mark for explanation]

b. Write a user defined function arrangelements(X),that accepts a list X of integers and sets all the negative elements to the left and all positive elements to the right of the list.

Eg: if L =[1,-2,3,4,-5,7] , the output should be: [-2,-5,3,4,7] 3

Ans: def arrangelements(X):

```
L=len(X)
```

```
for i in range(L):
```

```
    if a[i]<0 and i!=0:
```

```
        j=i
```

```
        while j!=0 and a[j-1]>0 :
```

```
            a[j],[j-1]=a[j-1],a[j]
```

```
            j=j-1
```

[1/2 mark for correct for loop]

[1/2 mark for correct if statement]

[1/2 mark for assigning I to j]

[1/2 mark for correct while loop]

[1/2 mark for exchanging with the adjacent value to the left]

[1/2 mark for decrementing j]

c. Consider the following class definition :- 3

```
class book ():
```

```
    bk = []
```

```
    def __init__(self, bno):
```

```
        self.bno = bno
```

```
    def addbook(self):
```

.....

```
def removebook (self):
```

```
.....
```

The class book is implemented **using Queue**. Keeping the same in mind, complete the function definitions for adding a book addbook() and deleting a book removebook() .

Solution :

```
def addbook(self):
```

```
    a=input("enter book number: ")
```

```
    book.bk.append(a)
```

```
def removebook (self):
```

```
    if (book.bk==[]):
```

```
        print "Queue empty"
```

```
    else:
```

```
        print "deleted element is: ",book.bk[0]
```

```
        del book.bk[0]
```

[½ mark for accepting a book no]

[1 mark for book.bk.append(a)]

[½ mark for checking whether Q is empty]

[½ mark for displaying the element being deleted.]

[½ mark for deleting the element]

d. Write a python function generatefibo(n) where n is the limit, using a generator function Fibonacci (max)( where max is the limit n) that produces Fibonacci series.. 3

Ans: 

```
def Fibonacci (max):
```

```
    a, b = 0, 1
```

```
    while a <= max:
```

```
        yield a
```

```
        a, b = b, a + b
```

```
def generatefibo(n)
```

```
    for i in Fibonacci (n):
```

```
        print i,
```

[1/2 mark for assigning 0,1 respectively to a,b]

[1/2 mark for correct loop]

[1 mark for yield a ]

[1/2 mark for assigning b to a ans a+b to b]

[1/2 mark for' for loop ' and print to display the fibonacci series]

e. Evaluate the following postfix using stack & show the content of the stack after the execution of each:

2

20, 4, +, 3, -, 7, 1

Ans:

S.no	Symbol	Operation	Stack	Result
1	20	push(20)	20	
2	4	push(4)	20,4	
3	+	pop(4)	20	
4		pop(20)		
		perform(20+4)		
		push (24)	24	
5	3	push(3)	24,3	
6	-	pop(3)	24	
		pop(24)		
		perform(24-3)		
		push (21)	21	
7	7	push (7)	21,7	
8	/	pop(7)	21	
		pop(21)		
		perform(21/7)		
		push (3)	3	
9		pop(3)		Result = 3

[½ mark each for correctly evaluating expression up to each operator.]

[½ mark for correct answer]

Qs.4 a. Consider the following code :

1

```
f = open ("mytry", "w+")
f.write ("0123456789abcdef")
f.seek (-3,2)    //1
printf.read(2)  //2
```

Explain statement 1 and give output of 2

Ans: Statement 1 uses seek() method can be used to position the file object at particular place in the file. Its syntax is :fileobject.seek(offset [, from\_what]).

So, f.seek(-3,2) positions the fileobject to 3 bytes before end of file.

Output of 2 is :de (It reads 2 bytes from where the file object is placed.)

[½ mark each for correct explanations for i and ii]

b. Write a user defined function in Python that displays the number of lines starting with 'H' in the file Para.txt. Eg: if the file contains:

2

Whose woods these are I think I know.  
His house is in the village though;  
He will not see me stopping here  
To watch his woods fill up with snow.

Then the line count should be 2.

Ans: def countH():

```
f = open ("Para.txt", "r")
lines = 0
l = f.readlines()
for i in l:
    if i[0] == 'H':
        lines += 1
print "no. of lines is", lines
```

[½ mark for opening PARA.TXT in input mode.]

[½ mark for reading lines from the file]

[½ mark for iterating through lines and checking whether they start with ‘H’]

[½ mark for incrementing and displaying the no. of lines.]

- c. Consider a binary file Employee.dat containing details such as empno:ename:salary (separator ‘:’). Write a python function to display details of those employees who are earning between 20000 and 40000.(both values inclusive) 3

Ans: def Readfile():

```
i = open("Employee.dat","rb+")
x = i.readline()
while(x):
    I = x.split(':')
    if (20000>=float(I[2])<=5000):
        print x
    x = i.readline()
```

[½ mark for opening “Employee.Dat” correctly.]

[½ mark for reading records from Employee.Dat.]

[½ for iterating through the file.]

[½ mark for using split().]

[½ mark for if statement to check the condition.]

[½ for printing the relevant record.]

### Section : C

Qs. 5 a. Differentiate between cardinality and degree of a table with the help of an example.2

Ans : Cardinality is defined as the number of rows in a table.

Degree is the number of columns in a table.

Eg: Consider the following tables:

Table : Account

Acno	Cname
Ac100	Sheela
Ac101	Darsh
Ac102	Kathy

Cardinality of Account table is : 3

Degree of Account table is :2

[1/2 mark each for definition of cardinality and degree]

[1 mark for correct demonstration using example]

b. Consider the following tables FACULTY and COURSES. Write SQL commands for the statements (i) to (v) and give outputs for SQL queries (vi) to (vii) 6

FACULTY

F_ID	Fname	Lname	Hire_date	Salary
102	Amit	Mishra	12-10-1998	12000
103	Nitin	Vyas	24-12-1994	8000
104	Rakshit	Soni	18-5-2001	14000
105	Rashmi	Malhotra	11-9-2004	11000
106	Sulekha	Srivastava	5-6-2006	10000

COURSES

C_ID	F_ID	Cname	Fees
C21	102	Grid Computing	40000
C22	106	System Design	16000
C23	104	Computer Security	8000
C24	106	Human Biology	15000
C25	102	Computer Network	20000
C26	105	Visual Basic	6000

- i) To display details of those Faculties whose salary is greater than 12000.

Ans: Select \* from faculty  
where salary > 12000

[1/2 mark for Select and from]

[1/2 mark for where]

- ii) To display the details of courses whose fees is in the range of 15000 to 50000 (both values included).

Ans: Select \* from Courses  
.where fees between 15000 and 50000

[1/2 mark for Select and from]

[1/2 mark for where]

- iii) To increase the fees of all courses by 500 of “System Design” Course.

Ans: Update courses set fees = fees + 500

where Cname = “System Design”

[1/2 mark for correct usage of update and set]

[1/2 mark for where]

- iv) To display details of those courses which are taught by ‘Sulekha’ in descending order of courses.

Ans: Select \* from faculty fac,courses cour

where fac.f\_id = cour.f\_id

and fac.fname = 'Sulekha'

order by cname desc

[1/2 mark for select and from ]

[1/2 mark for join condition]

[1/2 mark for checking fname = "Sulekha"]

[1/2 mark for order by]

- v) Select COUNT(DISTINCT F\_ID) from COURSES;

Ans: 4

[1/2 mark for the correct answer]

- vi) Select MIN(Salary) from FACULTY,COURSES where COURSES.F\_ID =  
FACULTY.F\_ID;

Ans: 6000

[1/2 mark for the correct answer]

- 6.a. State and Verify Absorption law algebraically 2

Ans: Absorption law states that:

$$A + AB = A \text{ and } A \cdot (A + B) = A$$

Algebraic method:

Taking LHS

$$A + AB = (A \cdot 1) + (A \cdot B) \text{ by Identity}$$

$$= A \cdot (1+B) \text{ by Distribution}$$

$$= A \cdot 1 \text{ by Null Element}$$

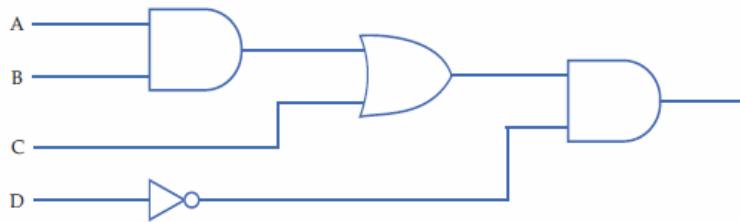
$$= A$$

[1 mark for the statement]

[1 mark for proving it algebraically]

b. Draw a logic circuit for the following Boolean expression:  $ab+c.d'$ .

2



[1/2 mark for correct representation of each gate]

c. Write the SOP form of a Boolean function F, which is represented in a truth table as follows:

1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

Ans:  $A'B'C + A'BC' + AB'C' + AB'C$

[1 mark for all the terms]

d. Obtain a simplified from for a Boolean expression:  
 $F(U, V, W, Z) = \Pi(0, 1, 3, 5, 6, 7, 15)$

3

	$w+z$	$w+z'$	$w'+z'$	$w'+z$	
$u+v$	0	1	3	2	
$u+v'$	4	5	7	6	
$u'+v'$	12	13	15	14	
$u'+v$	8	9	11	10	

$$(u+v+w).(u+z').(v'+w').(u'+w'+z)$$

[1 mark for correct K- Map representation]

[1/2 mark for 2 correct group, 1 for all 4 groups]

[1 mark for correct answer, ½ mark for two correct terms]

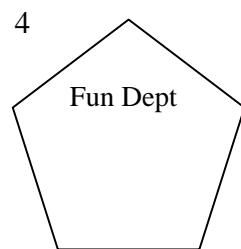
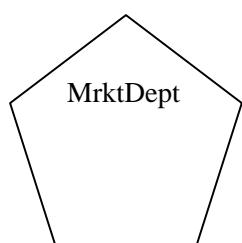
7.a. Write any 1 advantage and 1 disadvantage of Bus topology. 1

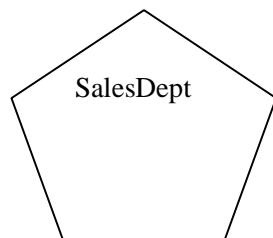
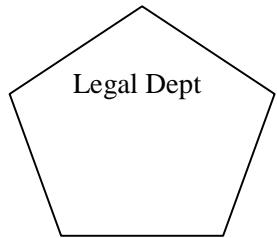
Ans: **Advantage:** Since there is a single common data path connecting all the nodes, the bus topology uses a very short cable length which considerably reduces the installation cost.

**Disadvantage:** Fault detection and isolation is difficult. This is because control of the network is not centralized in any particular node. If a node is faulty on the bus, detection of fault may have to be performed at many points on the network. The faulty node has then to be rectified at that connection point.

[1/2 mark each for advantage and disadvantage]

b. SunRise Pvt. Ltd. is setting up the network in the Ahmadabad. There are four departments named as MrktDept, FunDept, LegalDept, SalesDept.





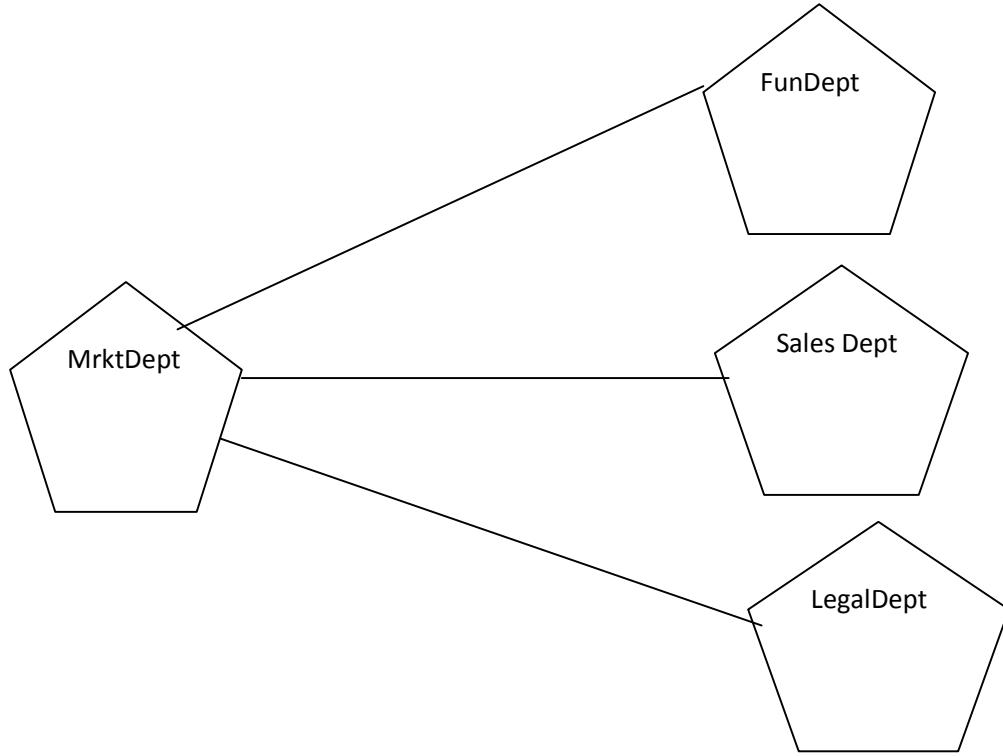
Distance between various buildings is as given:

MrktDept to FunDept	80 m
MrktDept to LegalDept	180m
MrktDept to SalesDept	100 m
LegalDept to SalesDept	150 m
LegalDept to FunDept	100 m
FunDept to SalesDept	50 m

Number of Computers in the buildings:

MrktDept	20
LegalDept	10
FunDept	08
SalesDept	42

- i) Suggest a cable layout of connections between the Departments and specify topology.



Star Topology should be used.

[1/2 mark for cable layout]

[1/2 mark for topology]

- ii) Suggest the most suitable building to place the server a suitable reason with a suitable reason.

Ans: As per 80 – 20 rule, MrktDept because it has maximum no. of computers.

[1 mark for the correct Answer]

- iii) Suggest the placement of i) modem ii) Hub /Switch in the network.

Ans: Each building should have hub/switch and Modem in case Internet connection is required.

[1 mark for the correct Answer]

iv) The organization is planning to link its sale counter situated in various part of the same city/ which type of network out of LAN, WAN, MAN will be formed? Justify.

Ans : MAN (Metropolitan Area Network)

[1 mark for the correct Answer]

c.Name the protocol 1

i. Used to transfer voice using packet switched network.

Ans: VOIP (Voice Over Internet Protocol)

[1 mark for the correct Answer]

ii.Used for chatting between 2 groups or between 2 individuals.

Ans: IRC(Internet Relay Chat)

[1 mark for the correct Answer]

d. What is an IP Address?

An IP address is a unique identifier for a node or host connection on an IP network. An IP address is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points. This is known as "dotted decimal" notation.

Example:140.179.220.200

1

[1 mark for correct definition]

or

[1 mark for example with explanation]

or

[1/2 mark for only writing a correct IP address]

e. What is HTTP? 1

Solution: HTTP is a protocol that is used for transferring hypertext(i.e. text,graphic,image,sound,video,etc,)between 2 computers and is particularly used on the World Wide Web (WWW).

[1 mark for definition/explanation]

f. Explain the importance of Cookies.

1

Ans : When the user browses a website, the web server sends a text file to the web browser. This small text file is a cookie. They are usually used to track the pages that we visit so that information can be customised for us for that visit.

[1/2 mark for definition]

[1/2 mark for its usage]

g. How is 4G different from 3G?

1

Ans: 3G technology adds multimedia facilities such as video, audio and graphics applications whereas 4G will provide better than TV quality images and video-links.

[1 mark for difference]

**CLASS-XII**  
**COMPUTER SCIENCE**  
**(Subject Code 083)**  
**SAMPLE PAPER 2014 - 15**

*Time allowed : 3 hours*

**Maximum Marks: 70**

Instructions: **(i) All questions are compulsory.**

**(ii) Programming Language: Section A C++.**

**(iii) Programming Language : Section B Python.**

**(iv) Answer either Section A or B, and Section C is compulsory.**

**Section A (C++)**

- Q1. a. Differentiate between ordinary function and member functions in C++. Explain with an example. [2]
- b. Write the related library function name based upon the given information in C++.
- (i) Get single character using keyboard. This function is available in stdio.h file.  
(ii) To check whether given character is alpha numeric character or not. This function is available in ctype.h file. [1]
- c. Rewrite the following C++ program after removing all the syntactical errors (if any), underlining each correction. : [2]

```
include<iostream.h>
#define PI=3.14
void main()
{
    float r;a;
    cout<<'enter any radius';
    cin>>r;
    a=PI*pow(r,2);
    cout<<"Area="<<a
}
```

- d. Write the output from the following C++ program code: [2]

```
#include<iostream.h>
#include<ctype.h>
```

```

void strcon(char s[])
{
    for(int i=0,l=0;s[i]!='\0';i++,l++)
    {
        for(int j=0; j<l; j++)
        {
            if (isupper(s[j]))
                s[j]=tolower(s[j])+2;
            else if ( islower(s[j]))
                s[j]=toupper(s[j])-2;
            else
                s[j]='@';
        }
    }
}

void main()
{
    char *c="Romeo Joliet";
    strcon(c);
    cout<<"Text= "<<c<<endl;
    c=c+3;
    cout<<"New Text= "<<c<<endl;
    c=c+5-2;
    cout<<"last Text= "<<c
}

```

e. Find the output of the following C++ program:

[3]

```

#include<iostream.h>
#include<conio.h>
#include<ctype.h>
class Class
{
int Cno,total;
char section;
public:
Class(int no=1)
{
Cno=no;
section='A';
total=30;
}
void addmission(int c=20)
{
section++;
total+=c;
}
void ClassShow()
{
cout<<Cno<<"."<<section<<"."<<total<<endl;
}

```

```

    }
}
void main()
{
    Class C1(5),C2;
    C1.addmission(25);
    C1.ClassShow();
    C2.addmission();
    C1.addmission(30);
    C2.ClassShow();
    C1.ClassShow();
}

```

- f. Study the following C++ program and select the possible output(s) from it :  
 Find the maximum and minimum value of L. [2]

```

#include<stdlib.h>
#include<iostream.h>
#include<string.h>
void main()
{
    randomize();
    char P[]="C++PROGRAM";
    long L;
    for(int I=0;P[I]!='R';I++)
    {
        L=random (sizeof(L)) +5;
        cout<<P[L]<<"-";
    }
}

```

- i) R-P-O-R-
- ii) P-O-R--
- iii) O-R-A-G-
- iv) A-G-R-M-

- Q2.a. How encapsulation and abstraction are implemented in C++ language?  
 Explain with an example. [2]

- b. Answer the questions (i) and (ii) after going through the following C++ class:  
 [2]

```

class Stream
{
    int StreamCode ; char Streamname[20];float fees;
public:
    Stream( )           //Function 1
{

```

```

        StreamCode=1;    strcpy    (Streamname,"DELHI");
fees=1000;
}
void display(float C)      //Function 2
{
cout<<StreamCode<<" :"<<Streamname<<" :"<<fees<<endl;
}
~Stream( )      //Function 3
{
cout<<"End of Stream Object"<<endl;
}
Stream (int SC,char S[ ],float F) ;           //Function 4
};

```

i) In Object Oriented Programming, what are Function 1 and Function 4 combined together referred as? Write the definition of function 4.

ii) What is the difference between the following statements?

```

Stream S(11,"Science",8700);
Stream S=Stream(11,"Science",8700);

```

c. Define a class Customer with the following specifications.

[4]

Private Members :

Customer\_no integer

Customer\_name char (20)

Qty integer

Price, TotalPrice, Discount, Netprice float

Member Functions:

Public members:

- \* A constructor to assign initial values of Customer\_no as 111, Customer\_name as "Leena", Quantity as 0 and Price, Discount and Netprice as 0.

- \* Input( ) – to read data members(Customer\_no, Customer\_name, Quantity and Price) call Caldiscount().

- \* Caldiscount ( ) – To calculate Discount according to TotalPrice and NetPrice

TotalPrice = Price\*Qty

TotalPrice >=50000 – Discount 25% of TotalPrice

TotalPrice >=25000 and TotalPrice <50000 - Discount 15% of TotalPrice

TotalPrice <250000 - Discount 10% of TotalPrice

Netprice= TotalPrice-Discount

\* Show( ) – to display Customer details.

d. Answer the questions (i) to (iv) based on the following code: [4]

```

class AC
{

```

```

        char Model[10];
        char Date_of_purchase[10];
        char Company[20];
    public( );
        AC();
        void entercardetail( );
        void showcardetail( );
    };
    class Accessories : protected AC
    {
    protected:
        char Stabilizer[30];
        char AC_cover[20];
    public:
        float Price;
        Accessories( );
        void enteraccessoriesdetails( );
        void showaccessoriesdetails( );
    };
    class Dealer : public Accessories
    {
        int No_of_dealers;
        char dealers_name[20];
        int No_of_products;
    public:
        Dealer( );
        void enterdetails( );
        void showdetails( );
    };

```

- (i) How many bytes will be required by an object of class Dealer and class Accessories?
- (ii) Which type of inheritance is illustrated in the above c++ code? Write the base class and derived class name of class Accessories.
- (ii) Write names of all the members which are accessible from the objects of class Dealer.
- (iv) Write names of all the members accessible from member functions of class Dealer.

Q3a) An array  $T[-1..35][-2..15]$  is stored in the memory along the row with each element occupying 4 bytes. Find out the base address and address of element  $T[20][5]$ , if an element  $T[2][2]$  is stored at the memory location 3000. Find the total number of elements stored in T and number of bytes allocated to T [3]

- b. Write a function SORTSCORE() in C++ to sort an array of structure IPL in descending order of score using selection sort . [3]

Note : Assume the following definition of structure IPL.

```
struct IPL
{
int Score;
char Teamname[20];
};
```

- c. Write member functions to perform **POP and PUSH** operations in a **dynamically allocated stack** containing the objects of the following structure: [4]

```
struct Game
{ char Gamename[30];
int numofplayer;
Game *next; }
```

- d. Write a function in C++ to print the sum of all the non-negative elements present on both the diagonal of a two dimensional array passed as the argument to the function. [2]

- e. Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:

2,13, + , 5, - ,6,3,/ ,5, \*, < [2]

- Q4. a. Write the command to place the file pointer at the 10th and 4th record starting position using seekp() or seekg() command. File object is 'file' and record name is 'STUDENT'. [1]

- b. Write a function in C++ to count and display the no of three letter words in the file "VOWEL.TXT". [2]

Example:

If the file contains:

A boy is playing there. I love to eat pizza. A plane is in the sky.

Then the output should be: 4

- c. Given the binary file CAR.Dat, containing records of the following class CAR type: [3]

```
class CAR
{
    int C_No;
    char C_Name[20];
    float Milage;
public:
    void enter( )
```

```

{
    cin>> C_No ; gets(C_Name) ; cin >> Milage;
}
        void display( )
{
    cout<< C_No ; cout<<C_Name ; cout<< Milage;
}
        int RETURN_Milage( )
{
    return Milage;
}
};

```

Write a function in C++, that would read contents from the file CAR.DAT and display the details of car with mileage between 100 to 150.

### **Section B (Python)**

- Q1.a) How is a static method different from an instance method? [2]
- b) Name the function / method required for [1]
- i) Finding second occurrence of m in **madam**.
  - ii) get the position of an item in the list
- c) Rewrite the following python code after removing all syntax error(s). Underline the corrections done. [2]

```

def main():
    r = raw_input('enter any radius : ')
    a = pi * math.pow(r,2)
    print " Area = " + a

```

- d) Give the output of following with justification [2]
- ```

x = 3
x+= x-x
print x

```

- e) What will be printed, when following python code is executed [3]

```

class person:
    def __init__(self,id):
        self.id = id
    arjun = person(150)
    arjun.__dict__['age'] = 50
    print arjun.age + len(arjun.__dict__)

```

Justify your answer.

f) What are the possible outcome(s) expected from the following python code?  
Also specify maximum and minimum value, which we can have. [2]

```
def main():
    p = 'MY PROGRAM'
    i = 0
    while p[i] != 'R':
        l = random.randint(0,3) + 5
        print p[l], '-',
        i += 1
    i) R - P - O - R -
    ii) P - O - R - Y -
    iii) O - R - A - G -
    iv) A - G - R - M -
```

Q2. a) How data encapsulation and data abstraction are implemented in python,  
explain with example. [2]

b) What will following python code produce, justify your answer [2]

```
x = 5
y = 0
print 'A'
try :
    print 'B'
    a = x / y
    print 'C'
except ZeroDivisionError:
    print 'F'
except :
    print 'D'
```

c) Write a class customer in python having following specifications [4]

Instance attributes:

customernumber - numeric value  
customername - string value  
price, qty, discount, totalprice, netprice - numeric value  
methods :

**init()** to assign initial values of customernumber as 111, customername as "Leena", qty as 0 and price, discount & netprice as 0.

**caldiscount ( )** – To calculate discount, totalprice and netprice

```
totalprice = price * qty
discount is 25% of totalprice, if totalprice >=50000
discount 15% of totalprice, if totalprice >=25000 and totalprice <50000
discount 10% of totalprice, if totalprice <250000
```

netprice= totalprice - discount

**input()** – to read data members customername, customernumber, price, qty and call caldiscount() to calculate discount, totalprice and netprice.  
**show( )** – to display Customer details.

d) What are the different ways of overriding function call in derived class of python ? Illustrate with example. [2]

e) Write a python function to find sum of square-root of elements of a list. List is received as argument, and function returns the sum. Ensure that your function is able to handle various situations viz. list containing numbers & strings, module required is imported etc. [2]

Q3. a) What will be the status of following list after third pass of bubble sort and third pass of selection sort used for arranging elements in ascending order?

40, 67, -23, 11, 27, 38, -1 [3]

b) Write a python function to search for a value in the given list using binary search method. Function should receive the list and value to be searched as argument and return 1 if the value is found 0 otherwise. [2]

c) Define stack class in python to operate on stack of numbers. [4]

d) Write a python function using yield statement to generate prime numbers till the value provided as parameter to it. [3]

e) Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:

2,13, + , 5, - ,6,3,/ ,5, \* ,< [2]

Q4.a) How is method write() different from writelines() in python? [1]

b) Given a pickled file - **log.dat**, containing list of strings. Write a python function that reads the file and looks for a line of the form

Xerror: 0.2395

whenever such line is encountered, extract the floating point value and compute the total of these error values. When you reach end of file print total number of such error lines and average of error value. [3]

c) Given a text file **car.txt** containing following information of cars carNo, carname, milage. Write a python function to display details of all those cars whose milage is from 100 to 150. [2]

## Section C

Q5. a. Define degree and cardinality. Based upon given table write degree and cardinality. [2]

### PATIENTS

| PatNo | PatName   | Dept  | DocID |
|-------|-----------|-------|-------|
| 1     | Leena     | ENT   | 100   |
| 2     | Surpreeth | Ortho | 200   |
| 3     | Madhu     | ENT   | 100   |
| 4     | Neha      | ENT   | 100   |
| 5     | Deepak    | Ortho | 200   |

b. Write SQL commands for the queries (i) to (iv) and output for (v) & (viii) based on a table COMPANY and CUSTOMER [6]

COMPANY

| CID | NAME       | CITY   | PRODUCTNAME |
|-----|------------|--------|-------------|
| 111 | SONY       | DELHI  | TV          |
| 222 | NOKIA      | MUMBAI | MOBILE      |
| 333 | ONIDA      | DELHI  | TV          |
| 444 | SONY       | MUMBAI | MOBILE      |
| 555 | BLACKBERRY | MADRAS | MOBILE      |
| 666 | DELL       | DELHI  | LAPTOP      |

CUSTOMER

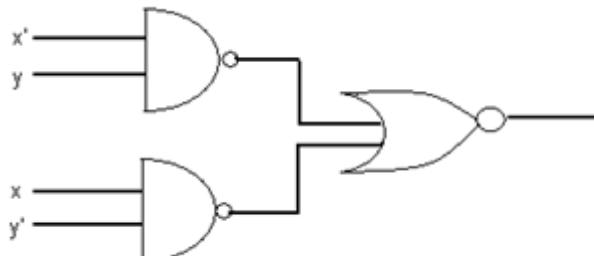
| CUSTID | NAME         | PRICE | QTY | CID |
|--------|--------------|-------|-----|-----|
| 101    | Rohan Sharma | 70000 | 20  | 222 |
| 102    | Deepak Kumar | 50000 | 10  | 666 |
| 103    | Mohan Kumar  | 30000 | 5   | 111 |
| 104    | Sahil Bansal | 35000 | 3   | 333 |

|     |                |       |    |     |
|-----|----------------|-------|----|-----|
| 105 | Neha Soni      | 25000 | 7  | 444 |
| 106 | Sonal Aggarwal | 20000 | 5  | 333 |
| 107 | Arjun Singh    | 50000 | 15 | 666 |

- (i) To display those company name which are having prize less than 30000.
- (ii) To display the name of the companies in reverse alphabetical order.
- (iii) To increase the prize by 1000 for those customer whose name starts with 'S'
- (iv) To add one more column totalprice with decimal(10,2) to the table customer
- (v) `SELECT COUNT(*),CITY FROM COMPANY GROUP BY CITY;`
- (vi) `SELECT MIN(PRICE), MAX(PRICE) FROM CUSTOMER WHERE QTY>10 ;`
- (vii) `SELECT AVG(QTY) FROM CUSTOMER WHERE NAME LIKE "%r%";`
- (viii) `SELECT PRODUCTNAME,CITY, PRICE FROM COMPANY,CUSTOMER WHERE COMPANY.CID=CUSTOMER.CID AND PRODUCTNAME="MOBILE";`

Q6. a) State and define principle of Duality. Why is it so important in Boolean Algebra? [2]

b) Write the equivalent boolean expression for the following logic circuit [2]



c) Write Product Of Sum expression of the function F (a,b,c,d) from the given truth table [1]

| a | b | c | d | F |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |

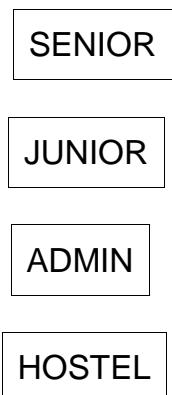
|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

d) Obtain the minimal SOP form for the following boolean expression using K-Map.

$$F(w,x,y,z) = (0,2,3,5,7,8,10,11,13,15) \quad [3]$$

Q7.a.Give any two advantage of using Optical Fibres. [1]

b. Indian School, in Mumbai is starting up the network between its different wings. There are Four Buildings named as SENIOR, JUNIOR, ADMIN and HOSTEL as shown below.: [4]



The distance between various buildings is as follows:

|                  |      |
|------------------|------|
| ADMIN TO SENIOR  | 200m |
| ADMIN TO JUNIOR  | 150m |
| ADMIN TO HOSTEL  | 50m  |
| SENIOR TO JUNIOR | 250m |
| SENIOR TO HOSTEL | 350m |
| JUNIOR TO HOSTEL | 350m |

Number of Computers in Each Building

|        |     |
|--------|-----|
| SENIOR | 130 |
| JUNIOR | 80  |
| ADMIN  | 160 |
| HOSTEL | 50  |

- (b1) Suggest the cable layout of connections between the buildings.
- (b2) Suggest the most suitable place (i.e. building) to house the server of this School, provide a suitable reason.

(b3) Suggest the placement of the following devices with justification.

- Repeater
- Hub / Switch

(b4) The organization also has Inquiry office in another city about 50-60 Km away in Hilly Region. Suggest the suitable transmission media to interconnect to school and Inquiry office out of the following .

- Fiber Optic Cable
- Microwave
- Radio Wave

c. Identify the Domain name and URL from the following. [1]

<http://www.income.in/home.aboutus.html>

d. What is Web Hosting? [1]

e. What is the difference between packet & message switching? [1]

f. Define firewall. [1]

g. Which protocol is used to creating a connection with a remote machine? [1]

**MARKING SCHEME**  
**COMPUTER SCIENCE (083)\_XII**  
**2014-15**

**SECTION – A**

- Q. 1.a Ordinary function : These are function define anywhere in the program and called directly using function name.

Example

```
void cube (int x)
{
    cout << x * x * x;
}
void main()
{
    int a;
    cin>>a;
    cube (a); //Function call.
}
```

Member function : These are function define inside the class and called using object.

class A

```
{ int x;

public:

void cube ()
{
    cout << x * x * x;
}

-----
};

void main ( )
{
    A1;
    =
    A1(cube( )); //Function call
}
```

(  $\frac{1}{2}$  Mark for each correct explanation and  $\frac{1}{2}$  Mark for each correct example of ordinary and member function)

- b. (i) getchar ( )

(ii) isalnum ( )

(  $\frac{1}{2}$  Mark for writing each correct library function name)

- c. # include <iostream.h >

# include <math.n >

```

#define PI 3.14
void main()
{
float r, a;
cout << "enter any radius ";
cin >>r;
a = PI * pow (r, 2);
cout << "Area =" << a;
}
( ½ Mark for each correction).

```

- d. Text = tMKCM@IMJGCR  
 New Text = CM@IMJGCR  
 last Text = IMJGCR

[ 1 Mark for first line  
 ½ Mark for second line  
 ½ Mark for third line]

- e. 5 : B : 55  
 1 : B : 50  
 5 : C : 85  
 [1 Mark for each correct line of output]

- f. (iii) O – R – A – G –  
 Minimum L value – 5  
 Maximum L value – 8  
 [1 Mark for correct option ½ Mark for each min and max value of L]

Q. 2. a Encapsulation : Wrapping up of data and associated function into a single group is called encapsulation.

Abstraction : Act of representing essential feature without including background detail is called abstraction.

In C++ encapsulation is implemented by using class and abstraction is implanted by using private access mode.

Ex.

```

class Stu
{
}

```

```

    {
        int rollno;
Abstraction  char name[20];
        float fees;
                                Encapsulation
public:
        void input ( );
        void output ( );
    };

```

[ ½ mark for each correct defn, and ½ mark for example]

b. Constructor overloading

```

void stream : : Steam (int Sc, char S[], float f)
{ streamcode = Sc;
strcpy (streamname, S);
fees = f;
}

```

[ ½ Mark for constructor overloading]  
( ½ Mark for defn.)

ii) Statement 1 – implicit call

Statement 2 – Explicit call

Implicit call – It will not create temporary object.

Explicit call – It will create temporary object with class name.

[ ½ mark for each correct name ]

c. class customer

```

{ private :
        int customer _ no;
        char customer_name [20];
        int Qty;
        float price, Totalprice, Discount, Netprice;
public :
        customer()
{
        customer_no=111;
        strcpy (customer_name, "Leena");
        Qty = 0;
        Price = Totalprice = Netprice = Discount = 0;
}
void input ( )

```

```

{ cout <<"Enter customer_no ,Customer_name, Qty and Price";
cin>>customer_no;
gets (Customer_name);
cin>> Qty;
cin>>prices;
Caldiscount( );
}

void Caldiscount ( );
void show ( )
{
cout << "customer_no : "<<customer_no;
cout << "\n name : "<<customer_name;
cout << "\n prince : "<<price;
cout << "\n Qty : "<< Qty;
cout << "\n Total price : "<<Totalprice;
cout << "\n Discount : "<<Discount;
cout << "\n Net price : "<< Netprice;
}

};

void customer :: Caldiscount( )
{
Totalprice = price * Qty;
if (Totalprice > = 50000)
    Discount = 25 * Totalprice / 100;
else if (Totalprice > = 25000)
    Discount = 15 * Totalprice / 100;
else
    Discount = 10 * Totalprice / 100;
}

( ½ mark for correct syntax for class header)
( ½ mark for correct declaration of data members)
( ½ mark for correct defn. of customer ( ) )
( ½ mark for correct defn. show ( ) )
(1 mark for correct defn. Caldiscount ( ) )
(1 mark for correct defn input () with proper invocation of caldiscount ( ) )

```

(  $\frac{1}{2}$  mark for each correct bytes)

(ii) Multilevel inheritance

Base class – AC

Derived class – Dealer

[  $\frac{1}{2}$  mark for correct option]

[  $\frac{1}{2}$  mark for correct base and derived class name]

(iii) Data member

**Member function**

Price

enteraccessoriesdetails ( )

showaccessoriesdetails ( )

enterdetails ( )

showdetails ( )

[  $\frac{1}{2}$  mark for correct Data Members]

[  $\frac{1}{2}$  mark for correct member functions]

iv)

**Data member**

**Member function**

Price

enterdetails ( )

No\_of\_dealers

showdetails ( )

Dealers\_name

enteraccessoriesdetails ( )

No\_of\_products

showaccessoriesdetails ( )

Stabilizer

entercarddetails ( )

AC\_Cover

voidshowcarddetails ( )

(  $\frac{1}{2}$  Mark for correct Data members)

(  $\frac{1}{2}$  Mark for correct member functions)

Q.3. a)  $m = 37$

$n = 18$

$w = 4$  bytes

$I_o = -1$

$J_o = -2$

$$T[1][J] = B + W [ (I - I_o) n + (J - J_o) ]$$

$$T[2][2] = 3000$$

$$T[20][5] = ?$$

$$T[2][2] = B + 4 [ 2 - (-1) \times 18 + (2 - (-2)) ]$$

$$3000 = B + 4 [ 3 \times 18 + 4 ]$$

$$= B + 4 [ 54 + 4 ]$$

$$= B + 4 [ 58 ]$$

$$3000 = B + 232$$

$$B = 3000 - 232$$

$$= 2768$$

$$\begin{aligned}T[20][5] &= 2768 + 4 [ (20 - (-1) \times 18 + (5 - (-2)) ] \\&= 2768 + 4 [ 21 \times 18 + 7 ] \\&= 2768 + 4 [ 378 + 7 ] \\&= 2768 + 4 \times 385 \\&= 2768 + 1540 \\&= 4308\end{aligned}$$

Total number of elements =  $37 \times 18 = 666$

Total bytes =  $4 \times 666 = 2664$  bytes

- [ 1 mark for correct formula ]
- [  $\frac{1}{2}$  mark for finding base address ]
- [  $\frac{1}{2}$  mark for finding correct address ]
- [  $\frac{1}{2}$  mark for total number of elements ]
- [  $\frac{1}{2}$  mark for total bytes ]

b)

```
void SORTSCORE (IPL l[], int n )
{ int i, POS, j;
  IPL small, temp;
  for ( i = 0; i < n-1; i++)
  { POS = i;
    small = l[ i];
    for ( j = i + 1; j < n; j++)
    {
      if ( l[ j] . score > small.score)
      { POS = j;
        Small = l[ j];
      }
      temp = l[ i];
      l[ i] = l[ POS];
      l[ POS] = temp;
    }
  }
}
[  $\frac{1}{2}$  mark for correct function Header]
```

- [ 1 mark for correct for loops]
- [ 1 mark for interchanging numbers ]
- [ ½ mark for changing small value ]

c)

```

struct Game
{ char Gamename [30];
int numberofplayer;
Game * next;
};

class stack
{
    Game * temp, * top;
public :
    stack ( )
    { top = NULL;
    }
    void POP ( );
    void push ( );
};

void stack :: POP ( )
{
    if ( top == NULL)
        cout << "Stack empty";
    else
    { temp = top;
    top = top ->next;
    delete (top);
    }
}

void stack :: push ( )
{
    temp = new (Game);
    cin >> temp->Gamename;
    cin >> temp->numberofplayer ;
    temp->next = top;
    top = temp;
}

( ½ mark for class defn.)
( ½ mark for constructor with top = NULL)

```

( 1 ½ mark for push function)

1 ½ mark for POP function )

d) void sumnegative (int A [ ] [10], int n )

{ int s = 0, i, j ;

for (i = 0; i < n; i++)

{

for ( j = 0; j <n; j++)

{

if ( ( i == j ) && (A[i][j] <0))

s += A [ i ] [j] ;

if ( ( i+j == n-1) && (A[i][j] <0))

s += A [ i ] [j] ;

}

}

cout << “ Total = ” <<s;

}

( ½ mark for for loop)

(½ mark for checking i == j , i + j == n – 1 and A[i][j]<0)

( ½ mark for finding sum)

( ½ mark for display sum )

e) 2 , 13, +, 5, -, 6, 3, /, 5, \*, <

STACK

2

2, 13

15

OPERATOR

+

15, 5

10

-

10, 6

10, 6, 3

/

10, 2, 5

\*

10, 10

<

0

Output

0 (False)

[ ½ mark for finding result upto ‘+’ operator

½ mark for finding result upto ‘-’ operator

$\frac{1}{2}$  mark for finding result upto ‘/’ operator  
 $\frac{1}{2}$  mark for finding result upto ‘<’ operator]  
[ 2 marks for correct answer with proper step]  
[ $\frac{1}{2}$  mark for only correct answer]

Q. 4. a) file . seekp ( 9 \* sizeof (STUDENT), ios :: beg ) ;  
file . seekp (3 \* sizeof (STUDENT), ios :: beg);

(  $\frac{1}{2}$  mark for each correct statements)

b) void counthree ()  
{ ifstream infile ( “ VOWEL . TXT”);  
char c [ 20 ]; int count = 0;  
if ( ! infile )  
    cout << “Not exist”;  
else  
{ infile . getline ( c, 20, ‘ ’ );  
if ( strlen (c ) == 3)  
    count + + ;  
}  
cout << “Total count =” << count;  
}  
(  $\frac{1}{2}$  mark for opening file )  
(  $\frac{1}{2}$  mark for reading string )  
(  $\frac{1}{2}$  mark checking and counting number of 3 character words)  
(  $\frac{1}{2}$  mark for printing count )

c) void fun ()  
{ CAR C;  
ifstream infile ( “ CAR.DAT” , ios :: binary) ;  
if ( ! infile )  
    cout << “ not exit ” ;  
else  
{ while (infile. read (( char \* ) &C, sizeof(C )))  
{  
if ( C. RETURN\_Milage () > = 100 && C. RETURN\_Milage( ) < = 150 )  
    C. display ( );  
}

```

    }
}

( 1 mark for opening CAR.DAT correctly )
( ½ mark for reading records )
( ½ mark for comparing millage )
(1 mark for displaying record )

```

## **SECTION – B**

Q.1 a)

| <b>Static Method</b>                       | <b>Instance Method</b>               |
|--------------------------------------------|--------------------------------------|
| i) are declared with keyword static        | No keyword required                  |
| ii) self is not required as first argument | first argument to function is 'self' |
| iii) invoked using class qualifier         | invoked using method qualifier       |
| iv) faster in execution                    | slower in execution                  |
| v) example                                 | Example                              |

( ½ mark each for any 2 correct points of comparison)

b) i) search(), find ( ), findall ( ) of string module.

( ½ mark for any correct method name)

(No marks to be deducted for not mentioning module name)

ii) index ( )

(  $\frac{1}{2}$  mark for the correct function name)

c) import math OR from math import pow

def main ( ):

\_\_\_\_\_ r = float (raw\_input ('enter any radius :'))

\_\_\_\_\_ a = 3.14 \* math.pow (r, 2) OR a = 3.14 \* pow (r, 2)

\_\_\_\_\_ print "Area = " , a

(  $\frac{1}{2}$  mark for each correction done.  $\frac{1}{2} \times 4 = 2$  for any 4 corrections. Similar type of correction are to be considered one).

(deduct  $\frac{1}{2}$  mark for not underlining the corrections)

(Any other correct solution should be considered)

d) 3

The expression will be  $x = x + x - x$ , substituting value of x as 3 we get  $3 + 3 - 3$  which is 3.

(1 mark for correct answer)

(1 mark for correct justification)

e) 52

Age is assigned value 50, and dictionary contains two elements id & age, so sum is 52.

(1 mark for correct answer)

(2 mark for correct justification)

- f) (iii) option , max value = 8, min value 5,

(1 mark for correct option number or option answer)

(1 mark for correct justification)

- Q.2. a) Encapsulation : Wrapping up of data and associated function into a single group is called encapsulation.

Abstraction : Act of representing essential feature without including background detail is called abstraction.

Example

```
class stu (object) :           # data abstraction
    def __init__(self):
        self.rollno = 0          # indentation is used for encapsulation
        self.name= ''
        self.fees = 0.0

    def input (self) :
        self.rollno = input ( )
        self.name = raw_input ( )
        self.fees = input ( )

    def output (self) :
        print self.rollno
        print self.name
```

```
print self.fees
```

( ½ mark each for correct definition )

( ½ mark each for specification of abstraction and encapsulation in example)

b)

A

B

F

A is 'print A' lies outside try.....except statement it will always be executed.

B is printed as it is first statement of try

Calculation of 'a' results in run time error (division by 0) so clause ZeroDivisionError is executed, hence value F is printed

( ½ mark for first two statement )

( ½ mark for last statement )

( 1 mark for justification )

c)

```
class customer(object):
```

```
    def __init__(self):
```

```
        self.customername = 111
```

```
        self.customername = 'Leena'
```

```
        self.qty = 0
```

```
        self.price, self.discount, self.netprice = 0, 0, 0
```

```
    def caldiscount(self):
```

```
        self.totalprice = self.price * self.qty
```

```
        if self.totalprice >= 50000:
```

```

        self.discount = 0.25

    elif 25000 >= self.totalprice < 50000 :

        self.discount = 0.15

    else :

        self.discount = 0.10

    self.netprice = self.totalprice * self.discount

def input(self):

    self.customername = raw_input ('enter customer name :')

    self.customernumber = input ('enter customer no.)

    self.qty = input ('enter quantity')

    caldiscount( )

def show(self) :

    print "customer number is :", self.customernumber

    print "customer name is :", self.customername

    print "quality purchased :", self.qty

    print "price of item :", self.price

    print "net price is :", self.netprice

```

( 1 mark for correct syntax of class)

( ½ mark for correct definition of init function)

( ½ mark for correct definition of show ( ) )

(1 mark for correct definition of input ( ) with proper invocation of caldiscount())

(1 mark for correct definition of caldiscount())

d) Example

```

class Base(object) :

    def __init__(self) :

        self.a = 0

        self.b = 0

class derived (Base):

    def __init__(self):

        super (Base, self).__ init__(self)

        self.c=0

```

### Example

```

class Base(object):

    def __ init__ (self) :

        self.a = 0

        self.b = 0

class derived (Base) :

    def __ init__(self):

        Base.__ init__(self)

        self.c=0

```

( 1 mark for either explanation / usage the super ( ))

( 1 mark for proper explanation / usage of Base class method with base class id)

e) import math

```

def lsum (list) :

    sum = 0

    try :

```

```
for val in list :  
    sum += math.sqrt (val)  
  
except ImportError :  
  
    print "you forgot to import math module"  
  
except TypeError :  
  
    print "list contains non numeric values"  
  
finally :  
  
    return sum
```

( ½ mark for correct function header )

( ½ mark each for correctly checking Import Error & Type Error)

( ½ mark for return of sum, in any way)

### Q.3.a) **Bubble sort**

1<sup>st</sup> pass :- 40, -23, 11, 27, 38, -1, 67

2<sup>nd</sup> pass :- -23, 11, 27, 38, -1, 40, 67

3<sup>rd</sup> pass :- -23, 11, 27, -1, 38, 40, 67

### **Selection Sort**

1<sup>st</sup> pass :- -23, 67, 40, 11 27, 38, -1

2<sup>nd</sup> pass :- -23, -1, 40, 11, 27, 38, 67

3<sup>rd</sup> pass :- -23, -1, 11, 40, 27, 38, 67

( ½ mark for each correct pass)

### b) **def bsearch (list, val):**

```
lb = 0
```

```
ub = len(list) - 1
```

```
while lb <= ub :
```

```
    mid = (lb + ub) / 2
```

```
    if list [mid] == val :
```

```
        return 1
```

```
    elif list[mid] < val :
```

```
        lb = mid + 1
```

```
    else :
```

```
        ub = mid - 1
```

```
return 0
```

( ½ mark for definition of lb & ub )

( ½ mark for correct re-definition of lb & ub )

( ½ mark for correct loop )

( ½ mark for returning correct value )

( any alternative code giving correct answer is acceptable)

c) class stack(object) :

```
S = [ ]
```

```
def push (self, data):
```

```
    stack.S.append(data)
```

```
def pop (self) :
```

```
    return stack.S.pop( )
```

( ½ mark for class header )

( ½ mark for list creation)

( ½ mark for each for member function header )

( 1 mark each for function statement )

d)

```
import math
```

```
def is_prime (numb) :
```

```
    if numb > 1 :
```

```
        if numb == 2 :
```

```
            return True
```

```
        if numb % 2 == 0 :
```

```
            return False
```

```
        for i in range (3, int(math.sqrt(numb)) + 1), 2) :
```

```
            if numb % i == 0 :
```

```
                return False
```

```
        return False
```

```
def get_primes (num) :
```

```
    while True :
```

```
        if is_prime(num):
```

```
            yield num
```

```
        num += 1
```

( ½ mark for checking constant 1 & 2)

( ½ mark for eliminating even numbers)

( 1 mark for checking of an odd number )

( 1 marks for correctly using yield statement)

e) 2 , 13, +, 5, -, 6, 3, /, 5, \*, <

| <u>STACK</u> | <u>OPERATOR</u> |
|--------------|-----------------|
| 2            |                 |
| 2, 13        |                 |
| 15           | +               |
| 15, 5        |                 |
| 10           | -               |
| 10, 6        |                 |
| 10, 6, 3     | /               |
| 10, 2, 5     | *               |
| 10, 10       | <               |
| 0            |                 |
| Output       | 0 or False      |

(½ mark for finding result upto ‘+’ operator)

(½ mark for finding result upto ‘-’ operator )

(½ mark for finding result upto ‘/’ operator)

(½ mark for finding result upto ‘<’ operator)

( 2 marks for correct answer with proper step)

(½ mark for only correct answer)

Q.4.a) write ( ) is used to write a string in the text file

writelines ( ) is used to write a string, list, tuple or dictionary in the data file.

(1 mark for correct difference or its representation through example)

b) def carfile():  
    ifile = open ('car.txt', 'r')  
    line = ifile.readline()  
    while line :  
        x = line.split ()  
        if 100 >= x [ 2 ] <= 150 :  
            print line  
        line = ifile.readline()  
    ifile.close()

( ½ mark for reading a line from the file)

( ½ mark for loop)

( ½ mark for splitting the content of string read from the file)

( ½ mark for correct comparison & printing)

c)

def fileprocess ( ) :  
    import pickle  
    list = [ ]  
    sum = 0  
    count = 0  
    file = open ( ' log.dat', 'rb')  
    List = pickle.load (file)  
    for i in List :

```

x = i.split()

if x[0].find('xerrox') == 0 :

    y = float(x [1])

    sum + = y

    count + = 1

    avg = sum / count

    print avg, count

```

( ½ mark for loading the file)

( ½ mark for the loop)

( ½ mark for comparsion)

( ½ each for sum and avg calculation)

( ½ mark for print)

## **SECTION – C**

- Q.5. a) Degree → number of columns in a table  
Cardinality → number of rows in a table.

Degree – 4

Cardinality – 5

( ½ mark each for correct concept of degree and cardinality )

( ½ mark each for correct degree and cardinality value )

- b) (i) Select comname  
from company, customer  
where company. CID = customer . CID  
and price < 30000;

[ ½ mark for First two line and ½ mark for where clause ]

(ii) select name  
from company  
order by name desc;

[ ½ mark for select and from and ½ mark for order by command]

(iii) update customer  
set price = price + 1000  
where name like 'S%';

[ ½ mark for update and set and ½ mark for where clause]

(iv) Alter table customer  
Add totalprice decimal ( 10, 2 );

[ ½ mark for First line and ½ mark for second line ]

(v)

| Count(*) | CITY   |
|----------|--------|
| 3        | DELHI  |
| 2        | MUMBAI |
| 1        | MADRAS |

[ ½ mark for correct answer ]

(vi) MIN (PRICE) MAX (PRICE)  
50000 70000

[ ½ mark for correct answer ]

(vii)

| AVG (QTY) |
|-----------|
| 11        |

[ ½ mark for correct answer]

(viii) PRODUCT NAME CITY PRICE  
MOBILE MUMBAI 70000

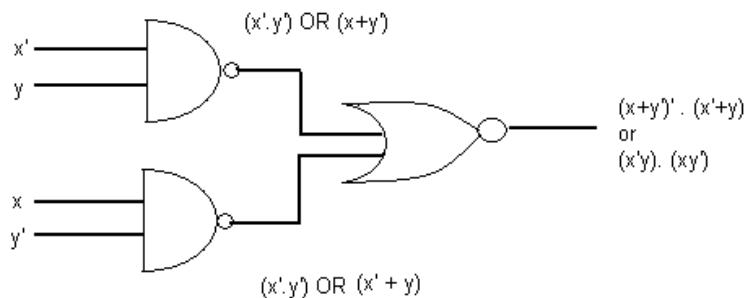
[  $\frac{1}{2}$  marks for correct answer]

- Q. 6 a) Principle of duality states that any theorem / identity / statement in Boolean algebra remains true if identity element (0,1) and operators (+, . ) are swapped.

Importance – It is sufficient to prove one part of them / identity / statement).

(1 mark for correct definition or an example depicting the correct definition)  
 ( 1 mark for its importance represented in any way)

b)



$$(x + y').(x'y)'$$

OR

$$(x'y).(xy)'$$

(  $\frac{1}{2}$  mark each for correct expansion of NAND gate)

(1 mark for the term of NOR gate)

c)

$$\Pi (0, 1, 4, 7, 8, 9, 12, 13, 14)$$

OR

$$M_0 \ M_1 \ M_4 \ M_7 \ M_8 \ M_9 \ M_{12} \ M_{13} \ M_{14}$$

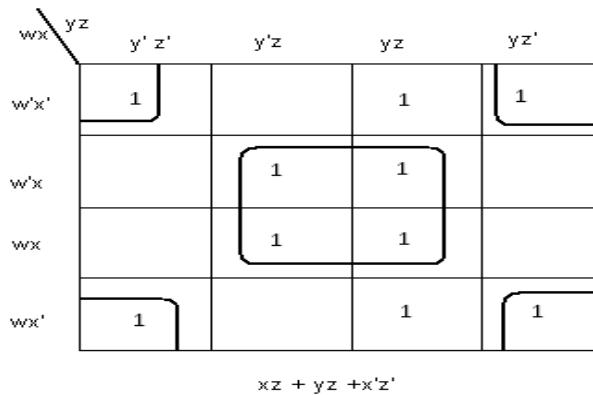
OR

$$(a+b+c+d) \cdot (a+b+c+d') \cdot (a+b'+c+d) \cdot (a+b'+c'+d) \cdot (a'+b+c+d) \cdot (a'+b+c+d') \\ \cdot (a'+b'+c+d) \cdot (a'+b'+c+d') \cdot (a'+b'+c'+d)$$

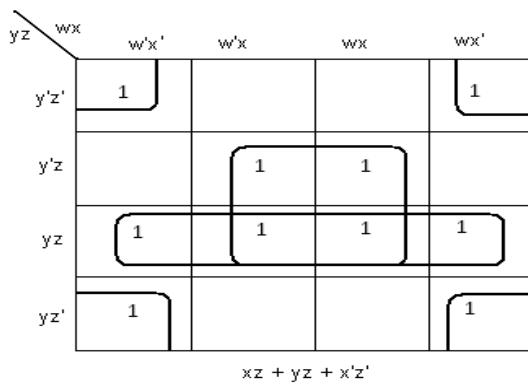
( 1 mark for correct answer)

(  $\frac{1}{2}$  for mentioning correct five term)

d)



OR



( 1 mark for correct k-map and representation of function)

(1/2 mark for two correct groups, 1 for all 4 groups)

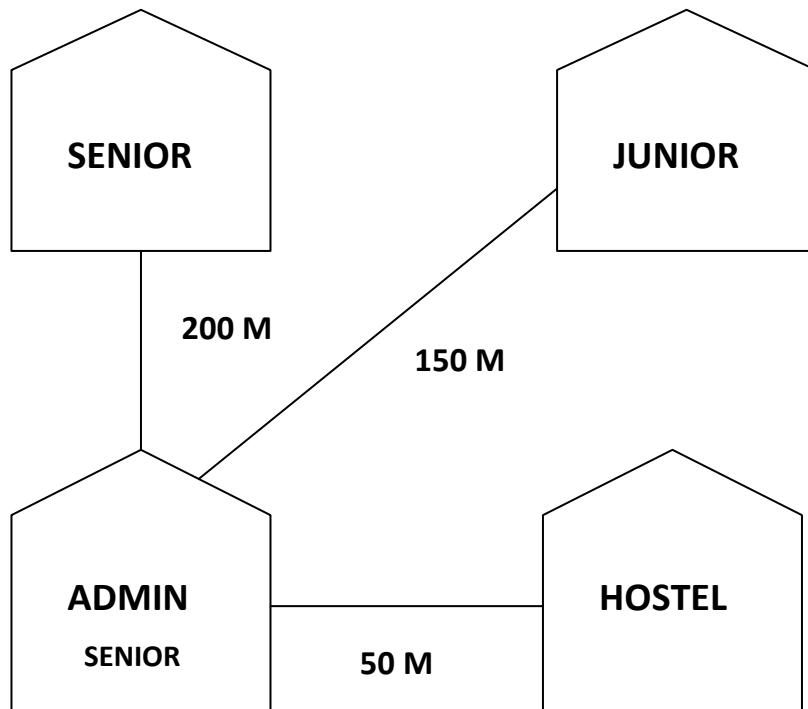
(1 mark for correct answer. ½ mark for two correct terms )

Q.7. a) Optical Fibres

- (i) It is immune to electrical and magnetic interference
- (ii) It is highly suitable for harsh industries environments
- (iii) Very high transmission capacity
- (iv) Secure transmission
- (v) It is used for broadband transmission.

[Any two option - 1 mark]

b) b 1)



[ 1 mark for correct layout ]

b 2)

ADMIN – because more number of computers

[  $\frac{1}{2}$  mark for suitable place and  $\frac{1}{2}$  mark for suitable reason ]

b 3)

Repeater → admin to senior

Hub / Switch → all building

[  $\frac{1}{2}$  mark for repeater and  $\frac{1}{2}$  mark for switch / Hub ]

b 4)

Radio wave.

[ 1 mark for correct option ]

c) URL → <http://www.income.in/home.aboutus.html>

Domain name → [www.income.in](http://www.income.in)

[ $\frac{1}{2}$  mark for URL and  $\frac{1}{2}$  mark for Domain name]

d) Web Hosting : web hosting is the process of uploading / saving the web content on a web server to make it available on www.

[ 1 mark for correct answer ]

e)

Circuit Switching

Packet Switching

- Complete physical connection is established between nodes
- No fixed size
- No physical connection is established
- Fixed Size

[ Any two correct difference 1 mark (i.e.) ½ mark each]

f) Firewall is hardware or software based network security system. It prevents unauthorized access to or from a network.

[ 1 mark for proper defn.]

e) Telnet.

[ 1 mark for correct protocol ]