

Strictly Confidential: (For Internal and Restricted use only)
Senior School Certificate Examination - September 2020
Marking Scheme - Informatics Practices (SUBJECT CODE: 065)
(SET-4 | SERIES: HMJ/C PAPER CODE - 90/C)

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 will 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, the 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 some Examiners 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 answers.)
 - j. Half or a part of the 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 Python only
- In 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

Answer the following questions:

1	(a)	Find the output of following program: <pre>import numpy as np Profits=np.array([1520, 1245, 1345, 1525, 2110, 1020, 1725]) print(Profits[2:5])</pre>	1
	Ans	[1345 1525 2110]	
		<i>(½ Mark for writing each correct value in the correct sequence upto Max. 1 Mark)</i>	
	(b)	Fill in the blank with appropriate numpy method to change the contents of the given 1 dimensional array Val1D into a 2 dimensional array Val2D with 3 rows and 2 columns per row: <pre>import numpy as np Val1D=np.array([15,25,35,45,55,65]) Val2D = _____</pre>	1
	Ans	<pre>np.array(Val1D.reshape(3,2))</pre>	
		<i>(1 Mark for writing correct missing statement)</i>	
	(c)	Fill in the blank with the correct statement to plot a bar graph using a matplotlib method, so that Company ABC can see the graphical presentation of its Profit figures for the 2nd quarter of the financial year 2019 (i.e. August, September, October, November). <pre>import matplotlib.pyplot as mtp Months = ['AUG', 'SEP', 'OCT', 'NOV'] #X Axis Profits = [125, 220, 230, 175] #Y Axis _____ mtp.show()</pre>	1
	Ans	<pre>mtp.bar(Months, Profits)</pre>	
		<i>(1 Mark for writing correct missing statement)</i>	
		OR	
		A pie chart is to be drawn(using pyplot) to represent Population of States. Fill in the blank with correct statement using a matplotlib method to draw the pie	

	<p>chart with labels for the pie slices as the names of the States and the size of each pie slice representing the corresponding Population of the States (in crores), as per the following table:</p> <table><tr><th>States</th><th>Population</th></tr><tr><td>Rajasthan</td><td>6.8</td></tr><tr><td>Karnataka</td><td>6.1</td></tr><tr><td>Tamilnadu</td><td>7.2</td></tr><tr><td>Goa</td><td>1.5</td></tr></table> <pre>import matplotlib.pyplot as plt States = ['Rajasthan', 'Karnataka', 'Tamilnadu', 'Goa'] Population = [6.8, 6.1, 7.2, 1.5] plt.show()</pre>	States	Population	Rajasthan	6.8	Karnataka	6.1	Tamilnadu	7.2	Goa	1.5								
States	Population																		
Rajasthan	6.8																		
Karnataka	6.1																		
Tamilnadu	7.2																		
Goa	1.5																		
Ans	<pre>plt.pie(Population, labels=States)</pre>																		
	<p><i>(½ Mark for mentioning plt.pie and ½ Mark for correct parameters)</i></p>																		
(d)	<p>Write the output of the following Python code:</p> <pre>import numpy as np Score1=np.array([90,92,94,96,95]) Score2=np.array([95,90,98,96,92]) S1=(np.where(Score1>Score2)) S2=(np.where(Score2>Score1)) print(Score1[S1], Score2[S2])</pre>	2																	
Ans	<pre>[92 95] [95 98]</pre>																		
	<p><i>(1 Mark for writing each correct list of 2 values)</i></p>																		
(e)	<p>The table below shows the Marks of two students for the four unit tests for academic session 2019-2020. Fill in the blanks to draw a line graph with Test Names on the X axis and Marks on the Y axis.</p> <table><tr><th rowspan="2">Tests</th><th colspan="2">Marks</th></tr><tr><th>Rohit</th><th>Suman</th></tr><tr><td>Unit1</td><td>85</td><td>97</td></tr><tr><td>Unit2</td><td>88</td><td>99</td></tr><tr><td>Unit3</td><td>89</td><td>90</td></tr><tr><td>Unit4</td><td>87</td><td>92</td></tr></table>	Tests	Marks		Rohit	Suman	Unit1	85	97	Unit2	88	99	Unit3	89	90	Unit4	87	92	2
Tests	Marks																		
	Rohit	Suman																	
Unit1	85	97																	
Unit2	88	99																	
Unit3	89	90																	
Unit4	87	92																	
	<pre>import matplotlib.pyplot as plt Tests = _____ #Assign Test Names Rohit = _____ #Assign Marks of Rohit Suman = _____ #Assign Marks of Suman plt.plot(Tests, Rohit, Suman) _____ #Label Y axis as Marks _____ #Add legends "Rohit", "Suman" for the lines plt.show()</pre>																		
Ans	<pre>['Unit1', 'Unit2', 'Unit3', 'Unit4'] [85, 88, 89, 87] [97, 99, 90, 92]</pre>																		

		<pre>plt.ylabel('Marks') plt.legend(['Rohit', 'Suman'])</pre>													
		<ul style="list-style-type: none">• (½ Marks for correct assignment of Tests as ['Unit1', 'Unit2', 'Unit3', 'Unit4'])• (½ Marks for correct assignment of Rohit and Suman as [85,88,89,87] and [97,99,90,92] respectively)• (½ Marks for writing <code>plt.ylabel('Marks')</code>)• (½ Marks for writing <code>plt.legend(['Rohit', 'Suman'])</code>)													
	(f)	Write single line Pandas statements for each of the following. (Assuming necessary modules have been imported): (i) Declare a Pandas series named Packets having dataset as: [125, 92, 104, 92, 85, 116, 87, 90] (ii) Display the median of the elements present in the dataset of Packets using the Pandas method for it.	2												
	Ans	(i) <code>Packets = pd.Series([125, 92, 104, 92, 85, 116, 87, 90])</code> (ii) <code>print(Packets.median())</code>													
		(1 Mark for writing each correct statement)													
	(g)	Write Numpy single line statement for each of the following from (i) to (iii) (i) To create a 3 x 2 array named ARR2D with the following values. (Assuming necessary modules have been imported as np): <div>ARR2D<table><tr><td>10</td><td>20</td></tr><tr><td>30</td><td>40</td></tr><tr><td>50</td><td>60</td></tr></table></div> (ii) Assign the contents of the above array ARR2D to a new 1D array named ARR1D . (iii) Display content of array ARR1D as follows: [10 20 30 40 50 60]	10	20	30	40	50	60	3						
10	20														
30	40														
50	60														
	Ans	(i) <code>ARR2D = np.array([10, 20], [30, 40], [50,60]))</code> (ii) <code>ARR1D = ARR2D.reshape(6)</code> (iii) <code>print(ARR1D)</code>													
		(1 Mark for writing each correct Numpy statement)													
		OR													
		Write Numpy single line statement for each of the following from (i) to (iii) (i) To create a 4 x 3 array named ARR with the following values. (Assuming necessary modules have been imported as np): <div>ARR<table><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><tr><td>100</td><td>110</td><td>120</td></tr></table></div> (ii) Topple the contents of the array ARR upside down so that its contents become:	10	20	30	40	50	60	70	80	90	100	110	120	
10	20	30													
40	50	60													
70	80	90													
100	110	120													

		<div>ARR</div> <table><tr><td>100</td><td>110</td><td>120</td></tr><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> <p>(iii) Display the changed content of the array ARR in the following format :</p> <pre>[[100 110 120] [70 80 90] [40 50 60] [10 20 30]]</pre>	100	110	120	70	80	90	40	50	60	10	20	30	
100	110	120													
70	80	90													
40	50	60													
10	20	30													
	Ans	<pre>(i) ARR = np.array([10,20,30],[40,50,60], [70,80,90],[100,110,120])) (ii) ARR=ARR[::-1] (iii) print(ARR)</pre>													
		<i>(1 Mark for writing each correct Numpy statement)</i>													
2	(a)	Write the correct option from (i) to (iv) for the method used in Pandas to calculate the correlation of values stored in a dataframe. (i) <code>cor()</code> (ii) <code>correlate()</code> (iii) <code>corr()</code> (iv) <code>correlation()</code>	1												
	Ans	(iii) <code>corr()</code>													
		<i>(1 Mark for writing the correct option)</i>													
	(b)	Write the correct output on execution of the following Pandas code: <pre>import pandas as pd df=pd.DataFrame([("Om",93),("Jay",91)],columns=['Name','Mark']) print(df.sort_values('Name', ascending=True))</pre>	1												
	Ans	<pre> Name Mark 1 Jay 91 0 Om 93</pre>													
		<i>(1 Mark for writing the correct output)</i>													
	(c)	Write the correct output on execution of the following Pandas code: <pre>import pandas as pd df1= pd.DataFrame(["First","Second"],columns=['Col']) df2= pd.DataFrame(["Third","Fourth"],columns=['Col']) df = pd.concat([df2, df1], ignore_index=True) print(df)</pre>	1												
	Ans	<pre> Col 0 Third 1 Fourth 2 First 3 Second</pre>													
		<i>(1 Mark for writing the correct output)</i>													
	(d)	Write the correct output on execution of the following Pandas code: <pre>import pandas as pd df = pd.DataFrame({"A": [1,3,2], "B": [5,1,4], "C": [3,4,7],</pre>	1												



		<pre> "D": [4,6,5], "E": [2,5,3]) print(df.quantile([0.5], axis = 1)) </pre>	
Ans		<pre> 0 1 2 0.5 3.0 4.0 4.0 </pre>	
		<i>(1 Mark for writing the correct output)</i>	
(e)	Write the correct output on execution of the following Pandas code:	<pre> import pandas as pd df = pd.DataFrame({'Name': ['Raj', 'Rita', 'Priya'], 'Type': ['Teacher', 'Student', 'Student'], 'Code': ['T01', 'S101', 'S102']}) print(df.pivot('Code', 'Type', 'Name')) </pre>	2
Ans		<pre> Type Student Teacher Code S101 Rita NaN S102 Priya NaN T01 NaN Raj </pre>	
		<i>(½ Mark for writing correct index as Code in the output)</i> <i>(½ Mark for writing correct columns as Student and Teacher in the output)</i> <i>(½ Marks for writing correct values of students and NaN for missing student)</i> <i>(½ Marks for writing correct value of teacher and NaN for missing teachers)</i>	
(f)	Write the correct output on execution of the following Pandas code:	<pre> import pandas as pd df = pd.DataFrame({"A": ["P01", "P02", "P03"], "B": ["Pen", "Pencil", "Eraser"]}) df=df.rename(columns={"A": "PID", "B": "PNAME"}) df=df.rename(index={0: 'A', 1: 'B', 2: 'C'}) print(df) </pre>	2
Ans		<pre> PID PNAME A P01 Pen B P02 Pencil C P03 Eraser </pre>	
		<i>(½ Mark for writing correct first column as Roll in the output)</i> <i>(½ Mark for writing correct second column as Name in the output)</i> <i>(½ Marks for writing correct changed index values as 1,2,3)</i> <i>(½ Marks for writing correct values of all the data)</i>	
		OR	
		Write the use of the <code>rename(mapper=<dict-like>, axis=1)</code> method for a Pandas Dataframe. Can the <code>mapper</code> and <code>columns</code> parameter be used together in a <code>rename()</code> method?	
Ans		Pandas <code>rename()</code> method is used to rename any index or column. The <code>mapper</code> parameter takes a dict-like Key:Value pair with Keys as previous names and Values with new names. <code>Axis =1</code> represents that the mapper is to rename the columns with the new names mentioned in the mapper dictionary.	

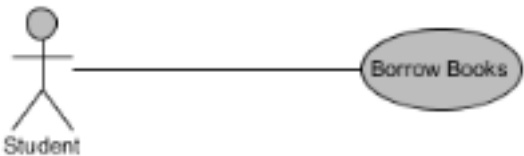
	No, the mapper and columns parameter cannot be used together in a rename() method. Either mapper with axis=1 or columns is to be used.																									
	(1 Mark for correcting writing the use of the <code>rename(mapper=<dict-like>, axis=1)</code> method) (1 Mark for correcting writing NO for the second part)																									
(g)	Consider a dataframe STOCK created with the following information. Write single line Pandas statements for each of (i), (ii) and (iii). (Assuming necessary modules have been imported as df): <table border="1"><thead><tr><th></th><th>ITEMS</th><th>ID</th><th>QUANTITY</th></tr></thead><tbody><tr><td>0</td><td>PEN</td><td>1001</td><td>500</td></tr><tr><td>1</td><td>PENCIL</td><td>1004</td><td>300</td></tr><tr><td>2</td><td>ERASER</td><td>1007</td><td>280</td></tr></tbody></table> (i) To display the total number of all ITEMS in the STOCK (ii) To display the total QUANTITY of all ITEMS in the STOCK (iii) To display the Average QUANTITY of all ITEMS in the STOCK		ITEMS	ID	QUANTITY	0	PEN	1001	500	1	PENCIL	1004	300	2	ERASER	1007	280	3								
	ITEMS	ID	QUANTITY																							
0	PEN	1001	500																							
1	PENCIL	1004	300																							
2	ERASER	1007	280																							
Ans	(i) <code>print(Stock["ID"].count())</code> (ii) <code>print(Stock["QUANTITY"].sum())</code> (iii) <code>print(Stock["QUANTITY"].mean())</code>																									
	(1 Mark for writing each correct statement)																									
	OR																									
	Consider a dataframe Travel created with the following information. Write single line Pandas statements for (i), (ii) and (iii): <table border="1"><thead><tr><th></th><th>T_Id</th><th>Type</th><th>Amount</th></tr></thead><tbody><tr><td>0</td><td>T_01</td><td>TO</td><td>550</td></tr><tr><td>1</td><td>T_02</td><td>FROM</td><td>300</td></tr><tr><td>2</td><td>T_03</td><td>TO</td><td>280</td></tr><tr><td>3</td><td>T_02</td><td>FROM</td><td>250</td></tr><tr><td>4</td><td>T_03</td><td>FROM</td><td>410</td></tr></tbody></table> (i) To display the maximum value of the column Amount (ii) To display the sum of Amounts for each Type separately (i.e sum of TOs and sum of FROMs) (iii) To display the mean for the column Amount		T_Id	Type	Amount	0	T_01	TO	550	1	T_02	FROM	300	2	T_03	TO	280	3	T_02	FROM	250	4	T_03	FROM	410	
	T_Id	Type	Amount																							
0	T_01	TO	550																							
1	T_02	FROM	300																							
2	T_03	TO	280																							
3	T_02	FROM	250																							
4	T_03	FROM	410																							
Ans	(i) <code>print(Travel["Amount"].max())</code> (ii) <code>print(Travel.groupby(["Type"]).sum())</code> (iii) <code>print(Travel["Amount"].mean())</code>																									
	(1 Mark for writing each correct statement)																									
(h)	Consider a set of information for an Exam conducted for students with following details: <table border="1"><thead><tr><th>Names</th><th>Marks</th><th>Trials</th><th>Passed</th></tr></thead><tbody><tr><td>Sanya</td><td>95</td><td>2</td><td>yes</td></tr></tbody></table>	Names	Marks	Trials	Passed	Sanya	95	2	yes	3																
Names	Marks	Trials	Passed																							
Sanya	95	2	yes																							

		<table border="1"> <tr><td>Krish</td><td>70</td><td>3</td><td>no</td></tr> <tr><td>Rishav</td><td>96.5</td><td>1</td><td>yes</td></tr> <tr><td>Deepak</td><td>75</td><td>2</td><td>no</td></tr> <tr><td>Kriti</td><td>92</td><td>1</td><td>yes</td></tr> </table> <p>Write a Pandas code to create a Dataframe named df with the above information with column names as “Names”, “Marks”, “Trials” and “Passed” and their values as given in the table. The code should then display the total number of rows and Total number of columns in the Dataframe separately as follows: Number of Rows: 5 Number of Columns: 4 NOTE: The code must use Dataframe methods to display the Total number of rows and Total number of columns in the dataframe</p>	Krish	70	3	no	Rishav	96.5	1	yes	Deepak	75	2	no	Kriti	92	1	yes	
Krish	70	3	no																
Rishav	96.5	1	yes																
Deepak	75	2	no																
Kriti	92	1	yes																
	Ans	<pre>import pandas as pd Data={'Names': ['Sanya', 'Krish', 'Rishav', 'Deepak', 'Kriti'], 'Marks': [95, 70, 96.5, 75, 92], 'Trials': [2, 3, 1, 2, 1], 'Passed': ['yes', 'no', 'yes', 'no', 'yes']} df = pd.DataFrame(Data) total_rows=len(df.axes[0]) total_cols=len(df.axes[1]) print("Number of Rows: ", total_rows) print("Number of Columns: ", total_cols)</pre>																	
		<p><i>(1 Mark for correctly declaring the Dataframe df with given values)</i> <i>(½ Mark for correctly calculating the total number of rows)</i> <i>(½ Mark for correctly calculating the total number of columns)</i> <i>(½ Mark for correctly printing the total number of rows)</i> <i>(½ Mark for correctly printing the total number of columns)</i></p>																	
	(i)	For the above created Dataframe df in Q.2(h) write single line statements for each of the following parts (a) to (d), which use Pandas method:	4																
		<p>a. To display the 'Names' and 'Marks' columns from the DataFrame. b. to change the 'Marks' in the 4th row (i.e. for index 3) to 91.5 c. to display the rows where number of 'Trials' in the examination is less than 2 and 'Marks' is greater than 95 d. to sort the DataFrame in descending order of 'Marks'</p>																	
	Ans	<pre>a. print(df[['Names', 'Marks']]) b. df.loc[3, 'Marks'] = 91.5 c. print(df[(df['Trials'] < 2) & (df['Marks'] > 95)]) d. df.sort_values(by=['Marks'], ascending=[False], inplace=True)</pre>																	
		<i>(1 Mark for writing each correct statement)</i>																	
SECTION B																			
3	(a)	List any two advantages of Iterative Model in Software development	1																
	Ans	(Any two from the following)																	

	<ul style="list-style-type: none"> • Inherent Versioning • Rapid Turnaround • Easy Adaptability 	
	OR (Any other two correct advantages of Iterative Model)	
	<i>(½ Mark for writing each correct advantage)</i>	
(b)	List any two advantages of Component Based Model in Software development	1
Ans	(Any two from the following) <ul style="list-style-type: none"> • Minimized delivery • Improved efficiency • Improved quality • Minimized expenditures OR (Any other two correct advantages of Component Based Model)	
	<i>(½ Mark for writing each correct advantage)</i>	
(c)	What is pair programming in Agile Method of Software development?	1
Ans	Pair programming is an agile software development technique in which two programmers work together at one workstation. One, the driver, writes code while the other, the observer or navigator, reviews each line of code as it is typed in.	
	<i>(1 Mark for writing correct explanation of pair programming)</i>	
(d)	List any one advantage and one disadvantage of a Waterfall Model of Software Development.	2
Ans	Advantages of waterfall model: (Any one from the following) <ul style="list-style-type: none"> • It allows for departmentalization and managerial control. • Simple and easy to understand and use. • Easy to manage due to the rigidity of the model - each phase has specific deliverables and a review process. • Phases are processed and completed one at a time. • Works well for smaller projects where requirements are very well understood. • A schedule can be set with deadlines for each stage of development and a product can proceed through the development process like a car in a car-wash, and theoretically, be delivered on time. Disadvantages of waterfall model: (Any one from the following) <ul style="list-style-type: none"> • It does not allow for much reflection or revision. • Once an application is in the testing stage, it is very difficult to go back and change something that was not well-thought out in the concept stage. • No working software is produced until late during the life cycle. • High amounts of risk and uncertainty. • Not a good model for complex and object-oriented projects. • Poor model for long and ongoing projects. • Not suitable for the projects where requirements are at a moderate to high risk of changing. OR (Any other one correct advantage and one correct disadvantage of Waterfall Model)	
	<i>(½ Mark for writing one correct advantage)</i>	
	<i>(½ Mark for writing one correct disadvantage)</i>	
	OR	

	List any one advantage and one disadvantage of an Evolutionary model of Software Development.	
Ans	<p>Advantages:(Any one from the following)</p> <p>In evolutionary models, a user gets a chance to experiment with a partially developed system.</p> <p>It reduces the error because the core modules get tested thoroughly.</p> <p>Disadvantage:</p> <p>Sometimes it is hard to divide the problem into several versions that would be acceptable to the customer which can be incrementally implemented and delivered.</p> <p>OR</p> <p>(Any other one correct advantage and one correct disadvantage of Evolutionary Model)</p>	
	<p><i>(½ Mark for writing one correct advantage)</i></p> <p><i>(½ Mark for writing one correct disadvantage)</i></p>	
(e)	What are the phases of an Agile Method in Software Development? Write any one advantage and one disadvantage of an Agile Method.	3
Ans	<p>Following are the phases in the Agile model are as follows:</p> <ul style="list-style-type: none"> • Requirements gathering • Design the requirements • Construction/ iteration • Testing/ Quality assurance • Deployment • Feedback <p>Advantage of Agile Method: (Any one from the following)</p> <ul style="list-style-type: none"> • Frequent Delivery • Face-to-Face Communication with clients. • Efficient design and fulfils the business requirement. • Anytime changes are acceptable. • It reduces total development time. <p>Disadvantages of Agile Model: (Any one from the following)</p> <ul style="list-style-type: none"> • Due to the shortage of formal documents, it creates confusion and crucial decisions taken throughout various phases can be misinterpreted at any time by different team members. • Due to the lack of proper documentation, once the project completes and the developers allotted to another project, maintenance of the finished project can become a difficulty. <p>OR</p> <p>(Any other one correct advantage and one correct disadvantage of Agile Method)</p>	
	<p><i>(1 Mark for writing one correct use of evolutionary Agile Method)</i></p> <p><i>(1 Mark for writing one correct advantage of Agile Method)</i></p> <p><i>(1 Mark for writing one correct advantage of Agile Method)</i></p>	
	OR	
	Write any three benefits of an Incremental Model over Waterfall model.	
Ans	<p>Compared to the waterfall model, incremental development has the following three important benefits:</p> <ol style="list-style-type: none"> 1. The cost of accommodating changing customer requirements is reduced. The amount of analysis and documentation that has to be redone is much less than that's required with the waterfall model. 2. It's easier to get customer feedback on the work done during development than when the system is fully developed, tested, and delivered. 	

	<p>3. More rapid delivery of <i>useful</i> software is possible even if all the functionality hasn't been included. Customers are able to use and gain value from the software earlier than it's possible with the waterfall model.</p> <p>OR</p> <p>(Any other three correct benefits of incremental model over waterfall model)</p>							
	<p>(1 Mark for writing each correct benefit of Incremental model over Waterfall Model)</p>							
(f)	<p>Match the following software development models in first column with their respective suitability in the second column</p> <table><tr><td>Spiral</td><td>Software development approach based on iterative development.</td></tr><tr><td>Agile</td><td>Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.</td></tr><tr><td>Incremental</td><td>Each loop represents a phase.</td></tr></table>	Spiral	Software development approach based on iterative development.	Agile	Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.	Incremental	Each loop represents a phase.	3
Spiral	Software development approach based on iterative development.							
Agile	Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.							
Incremental	Each loop represents a phase.							
Ans	<table><tr><td>Spiral</td><td>Each loop represents a phase.</td></tr><tr><td>Agile</td><td>Software development approach based on iterative development.</td></tr><tr><td>Incremental</td><td>Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.</td></tr></table>	Spiral	Each loop represents a phase.	Agile	Software development approach based on iterative development.	Incremental	Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.	
Spiral	Each loop represents a phase.							
Agile	Software development approach based on iterative development.							
Incremental	Take feedback on an initial implementation, and evolve through several versions until an acceptable system has been developed.							
	<p>(1 Mark for writing each correct match)</p>							
(g)	<p>(i) List any two properties of an actor in a Use Case Diagram.</p> <p>(ii) Draw the diagrammatic notations to represent an Actor and a Use Case in Use Case Diagrams</p>	4						
Ans	<p>(i) Properties of an Actor in a Use Case Diagram:(Any two form the following)</p> <ul style="list-style-type: none">Someone interacts with the use case (system function).Named by a noun.Actor plays a role in the businessSimilar to the concept of user, but a user can play different rolesFor example:A prof. can be instructor and also researcherplays 2 roles with two systemsActor triggers use case(s).Actor has a responsibility toward the system (inputs), and Actor has expectations from the system (outputs). <p>(ii)</p> <div></div>							
	<ul style="list-style-type: none">(1 Mark for writing each correct property of an Actor in a Use Case diagram)(1 Mark for drawing the diagrammatic notation to represent an Actor)							

		<ul style="list-style-type: none"> • (1 Mark for drawing the diagrammatic notation to represent a Use Case) 	
		OR	
		(i) List any two properties of a Use Case in a Use Case Diagram. (ii) What is an Association Link in a Use Case Diagram? Draw a diagrammatic notation to represent an Association Link between a Student and the act of Borrowing Books.	
	Ans	(i) Properties of a Use Case in a Use Case Diagram:(Any two form the following) <ul style="list-style-type: none"> • System function (process - automated or manual) • Named by verb + Noun (or Noun Phrase). • i.e. Do something • Each Actor must be linked to a use case, while some use cases may not be linked to actors. (ii) The Association link in a Use Case diagram illustrates the relationships between the actors and use cases. 	
		<ul style="list-style-type: none"> • (1 Mark for writing each correct property of a Use Case in a Use Case Diagram) • (1 Mark for explaining Association Link in a Use Case diagram) • (1 Mark for drawing diagrammatic notation for Association Link between a student and the act of borrowing books) 	
SECTION C			
4	(a)	Which SQL command is used to modify the existing structure of a table?	1
	Ans	ALTER TABLE	
		(1 Mark for writing the correct command)	
	(b)	Write whether the following statement is True or False for the GET method in Django: "GET requests are never cached"	1
	Ans	False	
		(1 Mark for writing False)	
		OR	
		Write whether the following statement is True or False for the POST method in Django: "POST requests should always be used for sensitive data"	
	Ans	True	
		(1 Mark for writing True)	
	(c)	Which of the following are correct aggregate functions in SQL: (i) AVERAGE () (ii) MAX () (iii) COUNT () (iv) TOTAL ()	1
	Ans	(ii) MAX () (iii) COUNT ()	
		(½ Mark for writing each correct aggregate function name)	
	(d)	Which of the following are not the correct names of Python files created by django-admin inside the folder "MyProject/MyProject" when we start a Django project with a command	1

	"django-admin startproject MyProject" (i) <code>urls.py</code> (ii) <code>admin.py</code> (iii) <code>MyProject.py</code> (iv) <code>settings.py</code>																									
Ans	(ii) <code>admin.py</code> (iii) <code>MyProject.py</code>																									
	(½ Mark for writing each incorrect filename)																									
(e)	Write the names of any two DML commands of SQL.	1																								
Ans	(Any two from the following) <ul style="list-style-type: none">• INSERT INTO• UPDATE SET• DELETE FROM																									
	(½ Mark for writing each correct DML command)																									
(f)	Explain each of the following with illustrations using a table: 1. Candidate Key 2. Primary Key 3. Foreign Key	3																								
Ans	<div>1. Candidate key : Any attribute which can be used to identify a record in a table.</div> <div>2. Primary key uniquely identifies a record in the table.</div> <div>3. Foreign key is an attribute in the table which is the primary key in another table.</div> <div>For example:</div> <div><div><div>TABLE: GARMENTS</div><table><tr><th>GNO</th><th>TYPE</th><th>COST</th></tr><tr><td>G1</td><td>TROUSER</td><td>450</td></tr><tr><td>G2</td><td>SHIRT</td><td>250</td></tr><tr><td>G3</td><td>SKIRT</td><td>300</td></tr><tr><td>G4</td><td>TSHIRT</td><td>200</td></tr></table><div><div>Primary Key</div><div>Candidate Keys</div></div></div><div><div>TABLE: SALES</div><table><tr><th>SNO</th><th>QTY</th><th>GNO</th></tr><tr><td>S1</td><td>1500</td><td>G1</td></tr><tr><td>S2</td><td>275</td><td>G3</td></tr></table><div>Foreign Key</div></div></div>	GNO	TYPE	COST	G1	TROUSER	450	G2	SHIRT	250	G3	SKIRT	300	G4	TSHIRT	200	SNO	QTY	GNO	S1	1500	G1	S2	275	G3	
GNO	TYPE	COST																								
G1	TROUSER	450																								
G2	SHIRT	250																								
G3	SKIRT	300																								
G4	TSHIRT	200																								
SNO	QTY	GNO																								
S1	1500	G1																								
S2	275	G3																								
	(½ Mark for writing each correct explanation) (½ Mark for writing each correct illustration in a table)																									
(g)	Observe the following tables TRANSACTIONS and CUSTOMERS carefully and answer the questions that follow:	3																								
	<div><div>TABLE: TRANSACTIONS</div><table><tr><th>TNO</th><th>TYPE</th><th>AMOUNT</th><th>CNO</th></tr><tr><td>T1</td><td>CREDIT</td><td>1000</td><td>C3</td></tr><tr><td>T2</td><td>DEBIT</td><td>1500</td><td>C1</td></tr></table></div> <div><div>TABLE: CUSTOMERS</div><table><tr><th>CNO</th><th>CNAME</th></tr><tr><td>C1</td><td>ZEESHAN</td></tr><tr><td>C2</td><td>AMAN</td></tr><tr><td>C3</td><td>JASPREET</td></tr></table></div>	TNO	TYPE	AMOUNT	CNO	T1	CREDIT	1000	C3	T2	DEBIT	1500	C1	CNO	CNAME	C1	ZEESHAN	C2	AMAN	C3	JASPREET					
TNO	TYPE	AMOUNT	CNO																							
T1	CREDIT	1000	C3																							
T2	DEBIT	1500	C1																							
CNO	CNAME																									
C1	ZEESHAN																									
C2	AMAN																									
C3	JASPREET																									
	(i) What is the Degree of the table TRANSACTIONS ? What is the cardinality of the table CUSTOMERS ?																									

Ans	Degree of the table TRANSACTIONS = 4 Cardinality of the table CUSTOMERS = 3																																																			
	<i>(½ Mark for writing correct Degree of the table TRANSACTIONS)</i> <i>(½ Mark for writing correct Cardinality of the table CUSTOMERS)</i>																																																			
	(ii) Identify the primary key and candidate keys from the table TRANSACTIONS.																																																			
Ans	TNO PRIMARY KEY, CNO CANDIDATE KEYS																																																			
	<i>(½ Mark for correct Primary Key, ½ Marks for correct Candidate Key)</i>																																																			
(h)	Write SQL queries for (i) to (iii) and the outputs for (iv) and (v), which are based on the following table PARTICIPANTS	4																																																		
	<table><tr><th colspan="5">Table: PARTICIPANTS</th></tr><tr><th>PNO</th><th>EVENT</th><th>SNAME</th><th>CLASS</th><th>DOB</th></tr><tr><td>P1</td><td>DEBATE</td><td>SANYAM</td><td>12</td><td>2001-12-25</td></tr><tr><td>P2</td><td>DEBATE</td><td>SHRUTI</td><td>10</td><td>2003-11-10</td></tr><tr><td>P3</td><td>DEBATE</td><td>MEHER</td><td>12</td><td>2001-11-10</td></tr><tr><td>P4</td><td>QUIZ</td><td>SAKSHI</td><td>11</td><td>2002-10-12</td></tr><tr><td>P5</td><td>QUIZ</td><td>RITESH</td><td>12</td><td>2001-10-12</td></tr><tr><td>P6</td><td>QUIZ</td><td>RAHUL</td><td>10</td><td>2003-10-12</td></tr><tr><td>P7</td><td>CROSSWORD</td><td>AMEER</td><td>11</td><td>2002-05-09</td></tr><tr><td>P8</td><td>CROSSWORD</td><td>MINAKSHI</td><td>12</td><td>2001-05-09</td></tr></table>	Table: PARTICIPANTS					PNO	EVENT	SNAME	CLASS	DOB	P1	DEBATE	SANYAM	12	2001-12-25	P2	DEBATE	SHRUTI	10	2003-11-10	P3	DEBATE	MEHER	12	2001-11-10	P4	QUIZ	SAKSHI	11	2002-10-12	P5	QUIZ	RITESH	12	2001-10-12	P6	QUIZ	RAHUL	10	2003-10-12	P7	CROSSWORD	AMEER	11	2002-05-09	P8	CROSSWORD	MINAKSHI	12	2001-05-09	
Table: PARTICIPANTS																																																				
PNO	EVENT	SNAME	CLASS	DOB																																																
P1	DEBATE	SANYAM	12	2001-12-25																																																
P2	DEBATE	SHRUTI	10	2003-11-10																																																
P3	DEBATE	MEHER	12	2001-11-10																																																
P4	QUIZ	SAKSHI	11	2002-10-12																																																
P5	QUIZ	RITESH	12	2001-10-12																																																
P6	QUIZ	RAHUL	10	2003-10-12																																																
P7	CROSSWORD	AMEER	11	2002-05-09																																																
P8	CROSSWORD	MINAKSHI	12	2001-05-09																																																
	(i) To display details of all PARTICIPANTS of CLASS 10 and 12																																																			
Ans	SELECT * FROM PARTICIPANTS WHERE CLASS IN(10,12) ; OR SELECT * FROM PARTICIPANTS WHERE CLASS =10 OR CLASS=12;																																																			
	<i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct WHERE clause)</i>																																																			
	(ii) To display the SNAME and CLASS of all PARTICIPANTS in ascending order of their SNAME.																																																			
Ans	SELECT SNAME, CLASS FROM PARTICIPANTS ORDER BY SNAME;																																																			
	<i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct ORDER BY clause)</i>																																																			
	(iii) To display the number of PARTICIPANTS along with their respective CLASS, of every CLASS.																																																			
Ans	SELECT COUNT(*) , CLASS FROM PARTICIPANTS GROUP BY CLASS;																																																			
	<i>(½ Mark for correct SELECT statement)</i> <i>(½ Mark for correct GROUP BY clause)</i>																																																			
	(iv) SELECT DISTINCT EVENT FROM PARTICIPANTS;																																																			

	Ans	<u>DISTINCT EVENT</u> CROSSWORD DEBATE QUIZ	
		<i>(½ Mark for writing correct output with or without column headings)</i>	
		(V) <code>SELECT MAX(DOB) , PNO FROM PARTICIPANTS GROUP BY PNO HAVING COUNT(*)>1;</code>	
	Ans	<u>MAX(DOB)</u> 2003-11-10	
		<i>(½ Mark for writing correct output with or without column headings)</i>	
		OR	
		Write Python code for the following: (a) To create a MySQL connection named db for localhost, with <code>username = "teacher"</code> and <code>password = "myclass"</code> (b) To create a database cursor named as <code>dbcrsr</code> . (c) To open a database named "CLASS" using the above declared database cursor <code>dbcrsr</code> . (d) To add a new record into the table "STUDENT" in the above connected database "CLASS" with details for the attributes (SNo, SName, Marks) as ("S102", "Tanya", 92.5)	
	Ans	(a) <code>db=MySQLdb.connect(host="localhost", user="teacher", passwd = "myclass")</code> (b) <code>dbcrsr = db.cursor()</code> (c) <code>dbcrsr.execute("USE CLASS")</code> (d) <code>dbcrsr.execute("INSERT INTO STUDENT (SNo, SName, Marks) VALUES ("S102", "Tanya", 92.5))</code>	
		<i>(1 Mark for writing each correct statement of the Python code)</i>	
SECTION D			
5	(a)	A software company purchases new computers every year and discards 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) Business Waste (B) Commercial Waste (C) Solid Waste (D) E-Waste	1
	Ans	(D) E-Waste	
		<i>(1 Mark for writing the correct option)</i>	
	(b)	Write names of any two common types of Intellectual Property Rights which are protected by the Law.	1
	Ans	(Any two from the following)	

	<ul style="list-style-type: none"> • Rights upon musical, literary, and artistic works • Rights upon discoveries and inventions • words, phrases, symbols, and designs • copyrights, trademarks, patents, industrial design rights and trade secrets <p>OR Any other two correct type of Intellectual Property Rights</p>	
	<i>(½ Mark for writing each correct type of Intellectual Property Rights)</i>	
(c)	A research student is expected to write a thesis on a topic. The student browses Internet for the topic and luckily finds it on the Internet. He copies and submits the entire thesis as his own research work. Which of the following activities appropriately categorises the act of the writer: (A) Spamming (B) Phishing (C) Plagiarism (D) Trojan	1
Ans	(C) Plagiarism	
	<i>(1 Mark for writing the correct option)</i>	
(d)	What is open source software? Write the names of any two software which can be categorized as Open Source.	2
Ans	Open source software is software with source code that anyone can inspect, modify, and enhance. Names of open source software (Any two from the following) <ul style="list-style-type: none"> • Mozilla's Firefox web browser. • Thunderbird email client. • PHP scripting language. • Python programming language. • Apache HTTP web server. • LibreOffice • GNU Image Manipulation Program • Linux operating system <p>OR Any other two correct names of Open Source Software</p>	
	<i>(1 Mark for writing correct explanation for open source software)</i> <i>(½ Mark for writing each correct name of an open source software)</i>	
(e)	Suggest techniques which can be adopted to impart Computer Education for: (i) visually impaired students (someone who cannot see). (ii) mobility challenged students (someone who cannot write).	2
Ans	(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) A mobility impaired student, who can not write using a pen can use voice recognition software on the computer.	
	<i>(1 mark for writing correct suggestion for visually impaired students)</i> <i>(1 mark for writing correct suggestion for mobility challenged students)</i>	
(f)	Write any three benefits of crowdsourcing.	3
Ans	<ul style="list-style-type: none"> • Crowdsourcing offers higher probabilities of success • Crowdsourcing saves time and money • Build up customer contacts and collect data <p>OR Any other three benefits of Crowdsourcing.</p>	

		<i>(1 Mark for writing each correct benefit of Crowdsourcing)</i>	
		OR	
		Write any three features of smart mobs.	
	Ans	<p>Three features of Smart Mobs include:</p> <ul style="list-style-type: none"> • Mobility through the use of wireless devices, such as mobile phones, pagers and personal digital assistants • Informal organization • Social networks in which every individual has links to other individuals through the Internet. <p>OR</p> <p>Any other three features of Smart Mobs.</p>	
		<i>(1 Mark for writing each correct feature of Smart Mobs)</i>	