

**Class XII**  
**Computer Science - OLD (283)**  
**Sample Question Paper 2019-20**

**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.

Q. No.	Part	Question Description	Marks
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)

	<p>(d) 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)
	<p>(e) 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)
	<p>(f) 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)

		<pre> int Alter=random(2) + 10 ; for (int C=0;C&lt;2;C++) {     N=random(2) ;     cout&lt;&lt;Ar[N] +Alter&lt;&lt;"#"; } } </pre>	
		(i) 21#20# (iii) 20#17#	(ii) 20#18# (iv) 21#17#
2	(a)	What is a copy constructor? Illustrate with a suitable C++ example.	(2)
	(b)	<p>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.</p> <pre> 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; } void main ( ) {     int X=7, Y=4, Z=3;     char C='#' ;     My_fun (C,Y) ;     My_fun (X,Z) ; } </pre>	(2)
		<b>OR</b>	
	(b)	Write any four differences between Constructor and Destructor function with respect to object oriented programming.	

(c)	<p>Define a class Ele_Bill in C++ with the following descriptions:</p> <p><b><u>Private members:</u></b></p> <table><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></table> <p>Amount can be calculated according to the following conditions:</p> <p><b><u>No of units Cost</u></b></p> <table><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></table> <p><b><u>Public members:</u></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																			
Pnumber	of type long																			
No_of_units	of type integer																			
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First 50 units	Free																			
Next 100 units	0.80 @ unit																			
Next 200 units	1.00 @ unit																			
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> <pre> Dname          string Distance       float Population     long int </pre> <p><u>Member functions</u> :</p> <pre> DINPUT( ) : To enter Dname, Distance and population DOUTPUT( ) : To display the data members on the screen. </pre>	

3	(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: <table border="1"><tr><td>24</td><td>16</td><td>14</td></tr><tr><td>19</td><td>5</td><td>4</td></tr></table> The output should be 42	24	16	14	19	5	4	(2)
	24	16	14						
	19	5	4						
	OR								
	(a)	Write a user defined function in C++ to find the sum of both left and right diagonal elements from a two dimensional array.		(3)					
(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)  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								
(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								
	(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.	(3)						
	OR								
	(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.							
	(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: struct Player { long Pid; char Pname[20];	(4)						

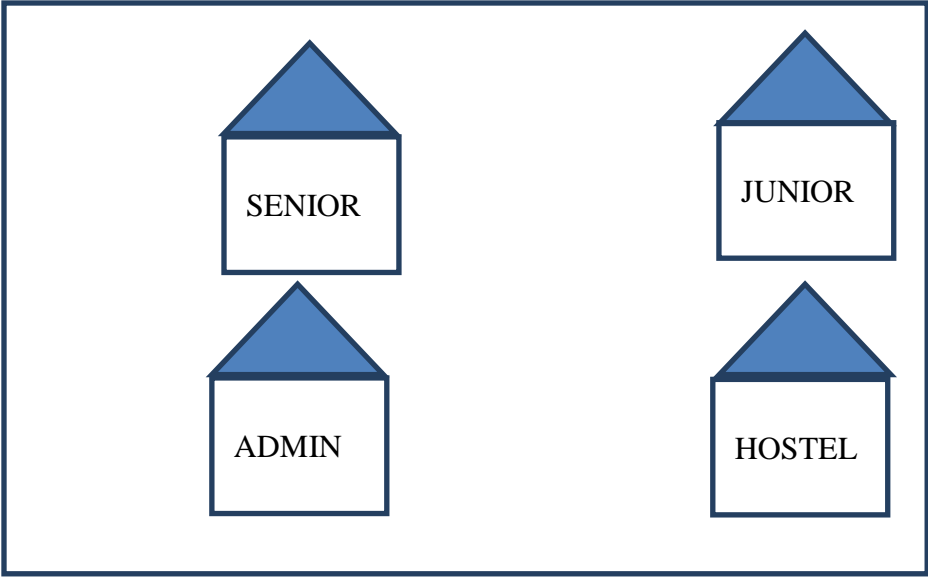
		<pre> }; const int size=10; class CQUEUE {     Player Ar[size];     int Front, Rear; public:     CQUEUE( )     {         Front = -1;         Rear = -1;     }     void Ins_Player(); // To add player in a static circular queue     void Del_Player(); // To remove player from a static circular queue     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 style="text-align: center;">A/B+C*(D-E)</p>	(2)
		<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>	(2)
		<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>	

	<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:</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> <p style="text-align: center;"><b>OR</b></p> <p>(b) 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()     {         count &lt;&lt; Rno&lt;&lt;sname&lt;&lt;endl;     } }; </pre>	(3)
	<p>(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 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>																																																																							
		<b>OR</b>																																																																							
	(c)	Which file stream is required for seekg() ?																																																																							
5	(a)	Observe the following table and answer the parts(i) and(ii) accordingly <b>Table:Product</b> <table><tr><th>Pno</th><th>Name</th><th>Qty</th><th>PurchaseDate</th></tr><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></table>	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)	Write the names of most appropriate columns, which can be considered as candidate keys.																																																																							
	(ii)	What is the degree and cardinality of the above table?																																																																							
	(b)	Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. <b>TRAINER</b> <table><tr><th>TID</th><th>TNAME</th><th>CITY</th><th>HIREDATE</th><th>SALARY</th></tr><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></table> <b>COURSE</b> <table><tr><th>CID</th><th>CNAME</th><th>FEES</th><th>STARTDATE</th><th>TID</th></tr><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></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)
TID	TNAME	CITY	HIREDATE	SALARY																																																																					
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C206	O LEVEL	18000	2018-07-25	105																																																																					

	(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"><tr><td>X</td><td>Y</td><td>Z</td><td>F(X,Y,Z)</td></tr><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></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)
X	Y	Z	F(X,Y,Z)																																				
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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:  F(X,Y,Z,W)= Σ (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> 	(4)

	<p>Distance between various wings are given below:</p> <table><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></table> <p>Number of Computers installed at various wings are as follows:</p> <table><tr><td><u>Wings</u></td><td><u>Number of Computers</u></td></tr><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></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	
Wing A to Wing S	100m																							
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<u>Wings</u>	<u>Number of Computers</u>																							
Wing A	20																							
Wing S	150																							
Wing J	50																							
Wing H	25																							
(i)	Suggest the best wired medium and draw the cable layout to efficiently connect various wings of Multipurpose Public School, Bangluru.																							
(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, Bangluru.																							