

KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION
COMPUTER SCIENCE(083)
SAMPLE QUESTION PAPER- 2012-13
CLASS XII
MARKING SCHEME

1	(a) When a function is overloaded, there are multiple definitions of the functions. What makes the various definitions of the function different from each other? 1. <i>No. of parameters</i> 2. <i>Data type of parameters</i> <i>1 mark for each point</i>	(2)
	(b) Which C++ header file(s) will be essentially required to run/execute the following C++ code? <pre>void main() { int Rno=465; char SName[]="Ajay Bhaskar"; cout<<setw(6)<<Rno<<setw(25)<<SName<<endl; }</pre> <i>iostream.h, iomanip.h</i>	(1)
	(c) Rewrite the following program after removing the syntactical errors (if any). Underline each correction. <pre>#include<iostream.h> struct Screen { int C, R;}//<u>semicolon</u> void ShowPoint(Screen P) { cout<<P.C<<P.R<<endl; // cascading operator } void main() { Screen Point1 = {5, 3}; // curly bracket ShowPoint(Point1); Screen Point2= point1; Point1.C+= 2; // accessing Point1.R = Point1.R + 2; } (<u>½ mark for each error</u>)</pre>	(2)
	(d) Find the output of the following program: <pre>#include<iostream.h> void ChangetheContent(int Arr[], int Count) { for(int C=0; C<Count; C++) Arr[C]= Arr[Count - C- 1]; } void main()</pre>	(3)

	<pre>{ int A[]={1, 2, 3}, B[] = {20, 30, 40, 50}, C[]={100, 200}; ChanetheContent(A,3); ChanetheContent(B,4); ChanetheContent(C,2); for(int L=0; L<3; L++) cout<<A[L]<<'#'; cout<<endl; for(int L=0; L<4; L++) cout<<B[L]<<'#'; cout<<endl; for(int L=0; L<2; L++) cout<<C[L]<<'#'; cout<<endl; }</pre> <p><i>Ans: 3#2#3# 50#40#40#50# 200#200# (1 mark for each correct line output)</i></p>	
(e)	<p>Give the output of the following program (Assuming that all required header files are included in the program)</p> <pre>void main() { char a[]="Exam-2011 AheAd"; int i; for(i=0; a[i] != '\0'; i++) { if(a[i]>= 97 && a[i]<=122) a[i]--; else if(a[i]>= '0' && a[i]<= '9') a[i] = a[i -1]; else if(a[i]>= 'A' && a[i]<= 'Z') a[i]+ = 32; else a[i]= '#'; } puts(a); }</pre> <p><i>Ans: ewal#####agdac</i></p>	(2)
(f)	<p>Study the following program and select the possible output from it:</p> <pre>#include<iostream.h> #include<stdlib.h> const int LIMIT = 4; void main() { randomize(); int Points; Points= 100 + random(LIMIT);</pre>	(2)

	<pre> for(int P=Points; P>=100; P--) cout<<P<<'#'; cout<<endl; } </pre> <p>(i) 103#102#101#100# (ii) 100#101#102#103# (iii) 104#103#102#101# (iv) 103#102#101#100</p> <p>Ans : (i)</p>					
2	<p>(a) What is copy constructor and parameterized constructor? Illustrate with an example. <i>½ mark for each suitable definition and ½ mark each for example.</i></p> <p>(b) Answer the questions (i) and (ii) after going through the following class:</p> <pre> class mammal{ public: char category[20]; mammal(char xname[]) // function1 { strcpy(category, xname) } mammal(mammal &t); //function2 }; </pre> <p>(i) Create an object, such that it invokes function1. (ii) Write complete definition for function2.</p> <p>Ans: (i) mammal ob("whale"); (ii) Mammal(mammal &ob) { strcpy(category, ob.category); }</p>	(2)				
	<p>(c) Define a class Sports in C++ with following descriptions:</p> <p>Private members:</p> <ul style="list-style-type: none"> • S_Code of type long • S_Name of type character array (String) • Fees of type integer • Duration of type integer <p>Public members:</p> <ul style="list-style-type: none"> • Constructor to assign initial values of S_Code as 1001, S_Name as "Cricket", Fees as 500, Duration 70 • A function NewSports() which allows user to enter S_Code, S_Name and Duration. Also assign the values to Fees as per the following conditions: 	(4)				
	<table border="1"> <thead> <tr> <th>S_Name</th> <th>Fees</th> </tr> </thead> <tbody> <tr> <td>Table Tennis</td> <td>2000</td> </tr> </tbody> </table>	S_Name	Fees	Table Tennis	2000	
S_Name	Fees					
Table Tennis	2000					

Swimming	4000
Football	3000

- A function DisplaySports() to display all the details.

Ans: class Sports

```

{
    long S_Code;
    char S_name[20];
    int Fees, Duration
public:
    sports()
    {
        S_Code= 1001;
        strcpy(S_Name,"Cricket");
        Fees= 500;
        Duration=70;
    }

    void NewSports();
    void DisplaySports();
}
};

void Sports::NewSports()
{
    cout<<"\n Enter Sports Code"; cin>> S_Code;
    cout<<"\n Sports Name"; gets(S_Name);
    cout<<"\n Duration"; cin>>Duration;
    if(strcmp(S_name, "Table Tennis")==0)
        Fees= 2000;
    else if(strcmp(S_name, "Swimming")==0)
        Fees= 4000;
    else
        Fees= 3000;
}

void Sports::DisplaySports()
{
    cout<<"\n Sports Code: "<<S_Code<<endl<<Sports Name :"<<S_Name<<endl<<"Fees :"
    <<Fess<<"\n Duration :"<<Duration;
}

```

1 mark for class definition + 1 mark for constructor + 1 ½ mark for NewSport() + ½ mark for display

(d) Consider the following declarations and answer the questions given below:

```

class NATION
{

```

(4)

	<pre> int H; protected: int S; public: void INPUT(); void OUTPUT(); }; class WORLD: private NATION { int T; protected: int U; public: void INDATA(int, int); void OUTDATA(); }; class STATE: public WORLD { int M; public: void DISPLAY(void); }; (i) Name the base class and derived class of the class WORLD. <i>NATION- base class, STATE- derived class</i> (ii) Name the data member(s) that can be accessed from function DISPLAY (). <i>Data member: U , M</i> (iii) Name the member function(s) which can be accessed from the objects of class STATE. <i>Functions: DISPLAY(), INDATA(), OUTDATA()</i> (iv) Is the member function OUTPUT() accessible by the objects of the class WORLD. <i>No, because function is derived privately into child class.</i> (1 mark each. No mark for partial answer.) </pre>	
3	<p>(a) Consider the following structure:</p> <pre> struct Employee { int ECode; char Ename[20]; }; </pre> <p>Write a function to accept an Employee array and perform insertion sort in the increasing order of ECode.</p> <pre> void insertionsort(Employee e[], int n) { Employee current; int pos, l, j; for(i=1;i<n;i++) { </pre>	(2)

	<pre> current= e[i]; pos=0; while ((pos<i)&&(e[pos].Ecode<=current.Ecode)) pos++; if(pos!=i) { for(j=i-1; j>=pos;j--) e[j+1]= e[j]; e[pos]= current; } } </pre> <p><i>½ mark for for loop+ ½ mark for while loop+1 mark for shifting of elements</i></p>	
(b)	<p>An array MAT[10][11] is stored in the memory column wise with each element occupying 4 bytes of memory. Find out the base address and the address of element MAT[5][10], if the location of MAT[1][4] is stored at the address 2000.</p> <p><i>1 mark for column wise formula [A[I,J]= B+ W((I-L1)+m(J-L2))</i></p> <p><i>1 mark for base address- 1836</i></p> <p><i>1 mark for address of element - 2256</i></p>	(3)
(c)	<p>Give the necessary declaration of a linked list implementation queue containing integer type elements. Also write a user defined function in C++ to delete an integer type number from the queue.</p> <pre> struct node{ int a; node *link; } class Queue{ node *front, *rear; public: Queue() { front=rear=NULL; } void Insert(int); void Delete(); }; void Queue::Delete() { node *temp; if(front) { temp=front; cout<<"\n Deleted Element : "<< temp->a; front=front->link; if (front==NULL) rear=NULL; delete(temp); } } </pre>	(4)

		<pre>}</pre> <p><i>1 mark for queue declaration + 1 mark for checking whether queue is existing or not + 1 mark for assigning the front to temporary variable and shifting to next element + 1 mark to check whether front is null or not and delete the current element.</i></p>	
	(d)	<p>Write a function in C++ to print the sum of all the non-negative elements present on either diagonal of a two dimensional array passed as the argument to the function.</p> <pre>void Sum(int a[][5], int m, int n) { int i, j sum=0; for (i=0;i<m;i++) for(j=0; j<n;j++) { If((i==j) (i+j<n-1)) If(a[i][j]>0) sum+= a[i][j]; } }</pre> <p><i>1 mark for loop + 1 mark for checking diagonal position + ½ mark to check whether number is positive or not + ½ mark for sum equation</i></p>	(3)
	(e)	<p>Evaluate the following postfix expression using a stack and show the contents of the stack after each operation.</p> <p>100, 40, 8, +, 20, 10, -, +, *</p> <p><i>Ans: 1 mark for showing the stack status and 1 mark for correct answer (5800)</i></p>	(2)
4	(a)	<p>Observe the program segment given below carefully and fill the blanks marked in statement 1 using seekg() or seekp() functions for performing the required task.</p> <pre>#include<fstream.h> class FILE { int Num; char Name[30]; public: void GO_Record(int); //function to read Nth record from the file void FILE::GO_Record(int N) { FILE Rec; Fstream File; File.open("STOCK",ios::binary ios::in); _____ //statement 1 File.read((char*)&Rec,sizeof(Rec)); cout<<Rec.Num<<Rec.Name<<endl; File.close(); } Ans. : File.seekg((N-1)*sizeof(FILE),ios::beg);</pre>	(1)
	(b)	<p>Write a function to count and print the number of complete words as "to" and "are" stored in a text file "ESSAY.TXT".</p> <pre>void CWORDS()</pre>	(2)

	<pre> { ifstream fin("ESSAY.TXT"); char st[80]; int count=0; while(!fin.eof()) { fin>>st; if(!fin) break; if(strcmi(st,"to") == 0 strcmi(st,"are")==0) count++; } cout<<"\nTotal 'to' & 'are' words = "<<count; fin.close(); </pre>	
(c)	<p>Write a function in C++ to display object from the binary file “PRODUCT.Dat” whose product price is more than Rs 200. Assuming that binary file is containing the objects of the following class:</p> <pre> class PRODUCT { int PRODUCT_no; char PRODUCT_name[20]; float PRODUCT_price; public: void enter() { cin>> PRODUCT_no ; gets(PRODUCT_name) ; cin >> PRODUCT_price; } void display() { cout<< PRODUCT_no ; cout<<PRODUCT_name ;cout<< PRODUCT_price; } int ret_Price() { return PRODUCT_price; } }; void Rec_display() { Product P; ifstream ifile("PRODUCT.Dat", ios::binary); if(!ifile) { cout<<"\n File doesn't exist"; exit(0); } else { while(ifile.read((char *)&P, sizeof(P))) </pre>	(3)

		<pre>{ if (P.ret_Price()>200) P.display(); } }</pre>																																																																									
5	(a)	<p>What do you understand by the terms Alternate key and Foreign Key of a relation?</p> <p><i>Alternate Key: Candidate key not selected as Primary Key.</i></p> <p><i>Foreign Key: Key which is primary in one table if it exist in other table it is called Foreign in that table. OR Key whose underlying value depends on the field where it is primary.</i></p>	(2)																																																																								
		<p>Consider the following tables SCHOOL and ADMIN. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).</p> <p style="text-align: center;">SCHOOL</p> <table border="1"> <thead> <tr> <th>CODE</th><th>TEACHERNAME</th><th>SUBJECT</th><th>DOJ</th><th>PERIODS</th><th>EXPERIENCE</th></tr> </thead> <tbody> <tr> <td>1001</td><td>RAVI SHANKAR</td><td>ENGLISH</td><td>12/03/2000</td><td>24</td><td>10</td></tr> <tr> <td>1009</td><td>PRIYA RAI</td><td>PHYSICS</td><td>03/09/1998</td><td>26</td><td>12</td></tr> <tr> <td>1203</td><td>LISA ANAND</td><td>ENGLISH</td><td>09/04/2000</td><td>27</td><td>5</td></tr> <tr> <td>1045</td><td>YASHRAJ</td><td>MATHS</td><td>24/08/2000</td><td>24</td><td>15</td></tr> <tr> <td>1123</td><td>GANAN</td><td>PHYSICS</td><td>16/07/1999</td><td>28</td><td>3</td></tr> <tr> <td>1167</td><td>HARISH B</td><td>CHEMISTRY</td><td>19/10/1999</td><td>27</td><td>5</td></tr> <tr> <td>1215</td><td>UMESH</td><td>PHYSICS</td><td>11/05/1998</td><td>22</td><td>16</td></tr> </tbody> </table> <p style="text-align: center;">ADMIN</p> <table border="1"> <thead> <tr> <th>CODE</th><th>GENDER</th><th>DESIGNATION</th></tr> </thead> <tbody> <tr> <td>1001</td><td>MALE</td><td>VICE PRINCIPAL</td></tr> <tr> <td>1009</td><td>FEMALE</td><td>COORDINATOR</td></tr> <tr> <td>1203</td><td>FEMALE</td><td>COORDINATOR</td></tr> <tr> <td>1045</td><td>MALE</td><td>HOD</td></tr> <tr> <td>1123</td><td>MALE</td><td>SENIOR TEACHER</td></tr> <tr> <td>1167</td><td>MALE</td><td>SENIOR TEACHER</td></tr> <tr> <td>1215</td><td>MALE</td><td>HOD</td></tr> </tbody> </table> <ul style="list-style-type: none"> i) To display TEACHERNAME, PERIODS of all teachers whose periods less than 25. Select TEACHERNAME, PERIODS from SCHOOL where PERIODS<25; ii) To display TEACHERNAME, CODE and DESIGNATION from tables SCHOOL and ADMIN whose gender is male. Select TEACHERNAME, SCHOOL.CODE, DESIGNATION from SCHOOL , ADMIN where SCHOOL.CODE=ADMIN.CODE and GENDER="MALE"; iii) To display the number of teachers in each subject wise. SELECT count(*) from SCHOOL group by SUBJECT; 	CODE	TEACHERNAME	SUBJECT	DOJ	PERIODS	EXPERIENCE	1001	RAVI SHANKAR	ENGLISH	12/03/2000	24	10	1009	PRIYA RAI	PHYSICS	03/09/1998	26	12	1203	LISA ANAND	ENGLISH	09/04/2000	27	5	1045	YASHRAJ	MATHS	24/08/2000	24	15	1123	GANAN	PHYSICS	16/07/1999	28	3	1167	HARISH B	CHEMISTRY	19/10/1999	27	5	1215	UMESH	PHYSICS	11/05/1998	22	16	CODE	GENDER	DESIGNATION	1001	MALE	VICE PRINCIPAL	1009	FEMALE	COORDINATOR	1203	FEMALE	COORDINATOR	1045	MALE	HOD	1123	MALE	SENIOR TEACHER	1167	MALE	SENIOR TEACHER	1215	MALE	HOD	(6)
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	<p>iv) To display CODE, TEACHERNAME and SUBJECT of all teachers who have joined the school after 01/01/1999.</p> <p>SELECT CODE, TEACHERNAME, SUBJECT from SCHOOL where DOJ>'01-Jan-1999';</p> <p>v) SELECT MAX (EXPERIENCE), SUBJECT FROM SCHOOL GROUP BY SUBJECT;</p> <p>10 English 16 Physics 15 Maths 5 Chemistry</p> <p>vi) SELECT TEACHERNAME, GENDER FROM SCHOOL, ADMIN WHERE DESIGNATION = 'COORDINATOR' AND SCHOOL.CODE=ADMIN.CODE;</p> <p>PRIYA RAI FEMALE LISA ANAND FEMALE</p> <p>vii) SELECT DESIGNATION, COUNT (*) FROM ADMIN GROUP BY DESIGNATION HAVING COUNT (*) <2;</p> <p>VICE PRINCIPAL 1</p> <p>viii) SELECT COUNT (DISTINCT SUBJECT) FROM SCHOOL;</p>																																					
	4																																					
6	<p>(a) Verify $X'.Y+X.Y'=(X'+Y').(X+Y)$ algebraically. $(X'.Y) + (X.Y') = (X'+X).(X'+Y').(Y+X).(Y+Y') // \text{Distributive law}$ $= 1. (X'+Y').(Y+X).1$ $=(X'+Y').(X+Y) = \text{R.H.S}$</p> <p>(b) Convert the following Boolean expression into its equivalent Canonical Product of Sum form: $X.Y'.Z + X'.Y.Z + X'.Y.Z'$</p>	(2)																																				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>X</th><th>Y</th><th>Z</th><th>F</th></tr> <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>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>0</td></tr> </table> <p>$(X+Y+Z). (X+Y+Z'). (X'+Y+Z). (X'+Y'+Z). (X'+Y'+Z')$</p>	X	Y	Z	F	0	0	0	0	0	0	1	0	0	1	0	1	0	1	1	1	1	0	0	0	1	0	1	1	1	1	0	0	1	1	1	0	(1)
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	(c) Write the equivalent Boolean Expression F for the following circuit diagram :	(2)																																				

	$F = (A' \cdot B) + (A \cdot B) + (B' \cdot C)$	
	(d) Reduce the following Boolean Expression using K-map: $F(X, Y, Z, W) = \Sigma(0, 1, 3, 4, 5, 7, 9, 10, 11, 13, 15)$	(3)
	$F = W + X'Z' + XY'Z$	
7	<p>(a) Define the term Bandwidth. Give any one unit of Bandwidth. <i>In electronic communication bandwidth is the width of the range of frequencies that an electronic signal uses on a given transmission medium.</i> <i>Bps(Bytes per second)</i></p> <p>(b) Difference between PAN and LAN. <i>Personal Area Network: Network within a small area</i> <i>Local Area Network: Network in a localized area.</i></p> <p>(c) What is iMAP? <i>Internet Message Access Protocol. Protocol for accessing e-mail from local server.</i></p> <p>(d) Compare VB Script and ASP. <i>VB Script- client side scripting. ASP- Server side scripting.</i></p> <p>(e) Ease and West Public Ltd has decided to network all its offices spread in five building as shown below:</p> <p>(i) Cable layout</p>	(1) (1) (1) (1) (4)

	<p>The distance between various buildings is as follows:</p> <table> <tbody> <tr><td>Building 1 to Building 2</td><td>20m</td></tr> <tr><td>Building 3 to Building 5</td><td>70m</td></tr> <tr><td>Building 2 to Building 3</td><td>50m</td></tr> <tr><td>Building 1 to Building 5</td><td>65m</td></tr> <tr><td>Building 3 to Building 4</td><td>120m</td></tr> <tr><td>Building 2 to Building 5</td><td>50m</td></tr> <tr><td>Building 4 to Building 5</td><td>30m</td></tr> </tbody> </table> <p>Number of Computers in each building:</p> <table> <tbody> <tr><td>Building 1</td><td>40</td></tr> <tr><td>Building 2</td><td>45</td></tr> <tr><td>Building 3</td><td>110</td></tr> <tr><td>Building 4</td><td>60</td></tr> <tr><td>Building 5</td><td>70</td></tr> </tbody> </table> <p>(ii) Suggest the most suitable building to install the server of the organization with a suitable reason. <i>Building 3. According to the 80:20 rule, building having more number of computers should be selected for installing server.</i></p> <p>(iii) Building 3 is used for many critical operations. It is tried that PC gets maximum possible bandwidth. Which network device is/should be used for this? <i>Switch</i></p> <p>(iv) The organization also has another office in same city but at a distant location about 25-30 Km away. How can link be established with building 1. (Suggest the transmission media).</p> <p>(v)</p>	Building 1 to Building 2	20m	Building 3 to Building 5	70m	Building 2 to Building 3	50m	Building 1 to Building 5	65m	Building 3 to Building 4	120m	Building 2 to Building 5	50m	Building 4 to Building 5	30m	Building 1	40	Building 2	45	Building 3	110	Building 4	60	Building 5	70	
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(f)	<p>Difference between Virus and Trojan <i>A computer virus is a computer program that can replicate itself and spread from one computer to another. Trojan horse is virtually a harmless program in itself, but at backend these programs perform some malicious activities like upload some security files and information from the computer.</i></p>	(1)																								
(g)	<p>Expand FSF and GNU. <i>Free Software Foundation.</i> <i>GNU's Not Unix.</i></p>	(1)																								