KENDRIYA VIDYALAYA SANGATHAN
MODEL QUESTION PAPER 8
CLASS XII COMPUTER SCIENCE (083)

Time: 3 hours **Max. Marks: 70**

BLUE PRINT OF QUESTION PAPER

S.No.	UNIT	VSA (1 Mark)	SA I (2 Marks)	SA-II (3 Marks)	LA (4 Marks)	Total
1.	**Review of C++ covered in class XI**	1(1)	8(4)	3(1)		12(6)
2.	**Object Oriented Programming in C++**					
	(a) Introduction to OOP using C++		2(1)		4(1)	6(2)
	(b) Constructor & Destructor		2(1)			2(1)
	(c) Inheritance				4(1)	4(1)
3.	Data Structure & Pointers					
	(a) Address Calculation			3(1)		3(1)
	(b) Static Allocation of objects		2(1)	3(1)		5(2)
	(c) Dynamic Allocation of Objects				4(1)	4(1)
	(d) Infix & Postfix expressions		2(1)			2(1)
4.	Data File Handling in C++					
	(a) Fundamentals of File Handling	1(1)				1(1)
	(b) Text File		2(1)			2(1)
	(c) Binary File			3(1)		3(1)
5.	**Databases and SQL**					
	(a) Database Concepts		2(1)			2(1)
	(b) Structured Query Language		2(1)		4(1)	6(2)

6.	**Boolean Algebra**					
	(a) Introduction to Boolean Algebra & Laws		2(1)			2(1)
	(b) SOP & POS	1(1)				1(1)
	(c) Karnaugh Map			3(1)		3(1)
	(d) Basic Logic Gates		2(1)			2(1)
7.	**Communication & Open Source Concepts**					
	(a) Introduction to Networking	2(2)				2(2)
	(b) Media. Devices. Topologies & Protocols				4(1)	4(1)
	(c) Security	2 (2)				2(2)
	(d) Webservers	1(1)				1(1)
	(e) Open Source Terminologies	1(1)				1(1)
	Total	9(9)	26(13)	15(5)	20(5)	70(32)

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Instructions:

(i) **All** questions are compulsory.

(ii) Programming Language : C++

1.	(a)	What is the difference between Local Variable and Global Variable? Also, give a suitable C++ code to illustrate both.	2
	(b)	Name the header files to which the following belong: 1. isalnum ( ) 2. strcat( )	1
	(c)	Rewrite the following program after removing the syntactical errors (if any). Underline each correction. #include [iostream.h] class MEMBER { int Mno;float Fees; PUBLIC: void Register(){cin>>Mno>>Fees;} void Display{cout<<Mno<<" : "<<Fees<<endl;} }; void main() { MEMBER M; Register(); M.Display(); }	2
	(d)	Find the output of the Following Program: #include<iostream.h> #include<conio.h> void main( ) { clrscr( ); int a =32; int *ptr = &a; char ch = 'D';	3

		char *cho=&ch; *cho+=a; *ptr += ch; *ptr *= 3; ch=ch-30; cout<< a << "" <<--ch<<endl; }	
	(e)	Find the output of the following Program. #include <iostream.h> #include <ctype.h> void Encrypt(char T[]) { for (int i=0;T[i]!='\0';i+=2) if (T[i]=='A' || T[i]=='E') T[i]='#'; else if (islower(T[i])) T[i]=toupper(T[i]); else T[i]='@'; } void main() { char Text[]="a WeB SeRVEr";//The two words in the string Text //are separated by single space Encrypt(Text); cout<<Text<<endl; }	2
	(f)	Find the ouptput of the following : #include<iostream.h> void main() { int x [ ] = { 10, 20, 30, 40, 50}; int *p, **q, *t; p = x; t = x + 1; q = &t; cout << *++p << "\t" << **q << "\t" << --*t; }	2
2.	(a)	Differentiate between private and protected visibility modes in context of object oriented programming using suitable example illustrating each.	2

	(b)	Answer the questions (i) and (ii) after going through the following class: class Cattle { public: char category[20]; Cattle(char xname[]) // function1 { strcpy(category, xname) } Cattle(Cattlel &t); //function2 }; (i) Create an object, such that it invokes function1. (ii) Write complete definition for function2.	2
	(c)	Define a class Show in C++ with the description given below: Private Members: name_of_Show of type character array(string) date_of_release of type character array(string) name_of_director of type character array(string) star of type int total_print_release of type int Public Members: A constructor to assign initial values as follows: name_of_Show NULL date_of_release 1_1_2007 name_of_director NULL star 2 total_print_release 100 A function calculate_star() which calculates and assigns the value of data member Star as follows: Total Print Release Star >= 1000 5 < 1000 & >=500 4 < 500 & >=300 3 < 300 & >=100 2 < 100 1 • A function EnterShow() to input the values of the data members name_of_Show, date_of_release, name_of_director and total_print_release and which invokes the function calculate_star( ). • A function DisplayShow() which displays the contents of all the data members for a play.	4

	(d)	Answer the question (i) to (iv) based on the following code: Class Medicines { char Category[10]; char Dateofmanufacture[10]; char Company[20]; public: Medicines(); void entermedicinedetails(); void showmedicinedetails(); } ; class Capsules : public Medicines { protected: char capsulename[30]; char volumelabel[20]; public: float Price; Capsules(); void entercapsuledetails(); void showcapsuledetails(); } ; class Antibiotics : public Capsules { int Dosageunits; char sideeffects[20]; int Usewithindays; public: Antibiotics(); void enterdetails(); void showdetails(); } ; (i) How many bytes will be required by an object of class Medicines and an object of class Antibiotics respectively? (ii) Write names of all the member functions accessible from the object of class Antibiotics. (iii) Write names of all the members accessible from member functions of class Capsules. (iv) Write names of all the data members which are accessible from objects of class Antibiotics.	4
3	(a)	An array E containing elements of structure Employee is required to be arranged in descending order of salary. Write a C++ function to arrange the same with the help of Selection sort. The array and its size is required to be passed as parameters to the functions. Definitions of the structure is as follows:	3

		struct Employee { int empno; char Ename[20]; float salary; };	
	(b)	An array S[40][30] is stored in the memory along the row with each of the element occupying 2 bytes, find out the memory location for the element S[20][10], if the Base Address of the array is 5000.	3
	(c)	Write a function in C++ to perform Insert operation in a dynamically allocated Queue containing names of students. Assume the following definition of NODE for the same is struct NODE { char Name[20]; NODE *Link; };	4
	(d)	Write a function in C++ to find the sum of diagonal elements from a 2 dimensional array of type float. Use the array and its size as parameters with float as its return type. The function should count middle element of array only once.	2
	(e)	Evaluate the following postfix expression using a stack and show the contents of the stack after each operation. 100, 40, 8, +, 20, 10, -, +, *	2
4	(a)	What is the significance of read() and write () function in respect of file handling in C++.	1
	(b)	Assume a text file "coordination.txt" is already created. Using this file create a C++ function to count the number of words having second character as small case vowel. **Example:** D**o** l**e**ss Thinking and p**a**y m**o**re attention t**o** y**o**ur h**e**art. D**o** L**e**ss Acquiring and p**a**y m**o**re Attention t**o** what y**o**u already h**a**ve. D**o** L**e**ss C**o**mplaining and p**a**y m**o**re Attention t**o** g**i**ving. D**o** L**e**ss criticizing and p**a**y m**o**re Attention t**o** C**o**mplementing. D**o** l**e**ss t**a**lking and p**a**y m**o**re attention t**o** SILENCE. **Output will be** : **Total words are 33**	2
	(c)	Given a binary file SPORTS.DAT, containing records of the following	3

structure type :

struct Sports

{

char Event[20];

char Participant[10][30];

};

Write a function in C++ that would read contents from the file SPORTS.DAT

and creates a file named SWIMMING.DAT copying only those records from

SPORTS.DAT where the event name is “Athletics”.

5. (a) Differentiate between candidate key and alternate key in context of RDBMS 2

(b) 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). 6

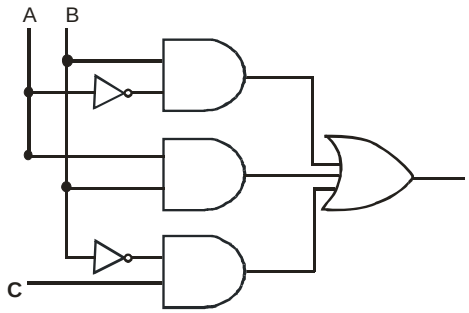
SCHOOL

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

ADMIN

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

i) To display TEACHERNAME, PERIODS of all teachers whose periods less than 25.
ii) To display TEACHERNAME, CODE and DESIGNATION from tables SCHOOL and

		ADMIN whose gender is male. iii) To display the number of teachers in each subject. iv) To display CODE, TEACHERNAME and SUBJECT of all teachers who have joined the school after 01/01/1999. v) SELECT MAX (EXPERIENCE), SUBJECT FROM SCHOOL GROUP BY SUBJECT; vi) SELECT TEACHERNAME, GENDER FROM SCHOOL, ADMIN WHERE DESIGNATION = 'COORDINATOR' AND SCHOOL.CODE=ADMIN.CODE; vii) SELECT DESIGNATION, COUNT (*) FROM ADMIN GROUP BY DESIGNATION HAVING COUNT (*) <2; (viii) SELECT COUNT (DISTINCT SUBJECT) FROM SCHOOL;	
6	(a)	State and Verify DeMorgan's Law algebraically in Boolean algebra.	2
	(b)	Write the equivalent Boolean Expression F for the following ***circuit diagram*** :  	2
	(c)	Convert the following Boolean expression into its equivalent Canonical Product of Sum form: $X.Y'.Z + X'.Y.Z + X'.Y.Z'$	1
	(d)	Obtain a simplified form for the following Boolean Expression using Karnaugh's Map F(a,b,c,d)=Σ(0,1,2,4,5,7,8,9,10,11,14)	3
7	(a)	**Expand the following terms in respect of networking:** i. FTP ii. PAN	1
	(b)	What are the cookies?	1

	(c)	What is difference between computer virus and computer worm?	1
	(d)	A company has to set up the network connection between the wings as per information given below:	4

Wing A to Wing S	100 meters
Wing A to Wing J	200 meters
Wing A to Wing H	400 meters
Wing S to Wing J	300 meters
Wing S to Wing H	100 meters
Wing J to Wing H	450 meters

Number of computers:

Wing A	15
Wing S	100
Wing J	5
Wing H	50

i. Suggest the most suitable topology for networking the computers of all the wings.

ii. Name the wing where the server should be installed. Justify your answer.

iii. Suggest the installation place for Hub/Switch in the network.

iv. Mention the most economical internet connectivity accessible to all the wings

	(e)	Distinguish between website and web browser.	1
	(f)	What is the significance of Cyber Law?	1

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MARKING SCHEME

1.	(a)	**Local Variables:** Local variables are those variables which are declared within a function or a compound statement and these variables can only be used within that function/scope. **Global Variables:** Global variables are those variables which are not declared within any function or scope. So, these variables can be accessed by any function of the program. **Example** #include<iostream.h> #include<conio.h.> int G; // Global variable declared void Fun ( ) { int L = 25; // Local variable of function Fun ( ) assigned value 25 G=5; // Global Variable is accessed and assigned value 5 Cout<<G<<endl; // Value of global variable is displayed as 5 Cout<<L<<endl; // Value of local variable is displayed as 25 } void main ( ) { Fun ( ) ; // Function call G = G + 5; // Global variable is incremented by 5 cout<<G<<endl; // Global variable is displayed as 10 } *(½ Mark for each correct explanation of Local Variable and Global Variable)* *(½ Mark for each correct example of Local variable and Global Variable)* *OR* *(Full 2 Maries for correct example(s) demonstrating the meaning of / difference between Local Variable and Global Variable)* *OR* *(Only 1 Mark to be awarded if Explanation without supporting examples)*	
	(b)	ctype.h string.h	
	(c)	#include <iostream.h> class MEMBER { int Mno;float Fees; **public:** void Register(){cin>>Mno>>Fees;} void Display(){cout<<Mno<<":"<<Fees<<endl;}	

		}; void main() { MEMBER M; **M.Register();** M.Display(); } ***(½ Mark each correction)***	
	(d)	396E ***(1 Mark for 396)*** ***(1 mark for E)***	
	(e)	*A @e@ @e@V#r* *(1 Mark for writing all alphabets at correct positions)* *(1/2 Mark for writing @ at correct positions)* *(1/2 Mark for writing # at correct position)*	
	(f)	19 19 19 ½ for correct First and third value 1 mark for correct middle value	
2.	(a)	If the visibility mode of the base class is private i.e. if the base class has been privately derived then the public and protected members of the base class become private members of the derived class. if the visibility mode of the base class is protected i.e. if the base class has been protectedly derived then the public and protected members of the base class become protected members of the derived class. (2 marks for correct answer)	
	(b)	(i) Cattle C("Cow"); // 1 m ark (ii)Cattle (Cattle &C) // 1 mark { strcpy(category, C.category); }	
	(c)	class show { char name_of_show[20]; char date_of_release[20], name_of_director[20]; int star; int total_print_release; public: show() { strcpy(Nameofshow," "); strcpy(dateof release,"1_1_2007"); strcpy(nameof director," "); star=2; totalprintrelease=100; }	

```
calculate_star()
{
if(totalprintrelease >=1000)
star =5;
else if(totalprintrelease >=500)
star=4;
else if(totalprintrelease >=300)
star=3;
else if(totalprintrelease >=100)
star =2;
else
star =1;
}
void EnterShow()
{
gets(name_of_Show,);
gets(date_of_release);
 gets(name_of_director);
cin>>total_print_release;
calculate_star();
}


void  DisplayShow()
{
cout<< name_of_Show<<date_of_release;
cout<< name_of_director<<total_print_release<<Star;
}
```

(½ Mark for correct syntax for class header)
(½ Mark for correct declaration of data members)
(½ Mark for constructor)
(1 Mark for calculation of correct star for each condition)
(1 Mark for correct definition of EnterShow() with proper invocation of calculate_star())
(½ Mark for correct definition of function DisplayShow())

(d)

(i) Class Medicines – 40 bytes, cl;ass Antibiotics – 118 bytes
(½ mark for each correct answer)

(ii) enterdetail(), showdetails(), entercapsuledetails(), showcapsuldetails(), entermedicinedetails(), showmedicinedetails()
(1 mark for correct answer. No mark for partialy correc answer.)

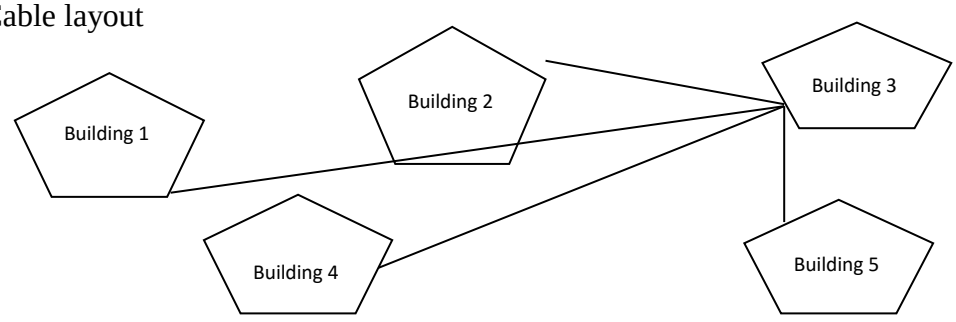
(iii)Data Members: price, capsulename, volumelabel
Member Functions: entermedicinesdetails(), showmedicinedetails(),entercapsuledetails(), showcapsuledetails()
(½ mark for writing correct data members)
(½ mark for writing correct member functions)

		(iv)price **(1 mark for correct answer.)**	
3	(a)	void Arrange (Employee E[ ], int size) { int i,j, temp ; Employee temp; cout<< " Arranging in Descending Order\n\n"; for(i=0; i<size;i++) { highest=E[i].salary; pos=i; for(j=i+1 ; j<size; j++) { **if(E [j] . salary > highest)** { highest=E [j].salary; pos = j; } } temp=E[i] ; E[i]=E[pos]; E[pos]=temp; } } **½ mark for correct function header** **1 mark for declaration of temp of Employee type.** **1 mark for correct if condition** **½ mark for swapping**	
	(b)	Given, W=2 N=40 M=30 Base(S)=5000 Row Major Formula: Loc(S[I][J]) =Base(S)+W*(M*I+J) Loc(S[20][10]) =5000+2*(30*20+10) =5000+2*(600+10) =5000+1220 =6220 *(1 Mark for writing correct formula (for column major) OR substituting formula with correct values)* *(1 Mark for writing calculation step - at least one step)*	

		(1 Mark for correct address)	
	(c)	struct NODE { char Name[20]; NODE *Link; }; class QUEUE { NODE *R,*F; public: QUEUE(); void Insert(); void Delete(); }; void QUEUE::Insert() { NODE *Temp; Temp=new NODE; gets(Temp->Name); Temp->Link=NULL; if (Rear==NULL) { Rear=Temp; Front=Temp; } else { Rear->Link=Temp; Rear=Temp; } } *(1 Mark for creating a new node and assigning/entering appropriate values in it)* *(1 Mark for checking if Queue is Empty)* *(1 Mark for assigning Rear and Front as Temp - if Queue is Empty)* *(1 Mark for assigning Rear->Link as Front and Rear as Temp)*	
	(d)	Assuming that maximum rows and columns are 10, 10 respectively. The function definition is given below: float Sumdiagonal(float a[10][10], int r, int c) { float sum = 0.0; for (int i =0 ; i <row ; i++) { for (int j =0; j<col; j++) {	

		if (i==j) sum + = a[i][i]; if((i+j) = = (r-1) &&(i!=j)) sum+=a[i][j]; } } return sum; } **½ mark for correct function header (½)** **½ marks for each for lop (1 mark)** **½ mark for each if condition (1 mark)** **½ for returning sum(½)**	
	(e)	*Ans: 1 mark for showing the stack status and 1 mark for correct answer (**5800**)*	
4	(a)	read() is used to fetch the data from a binary file and write () is used to write data into a binary file. 1 mark for correct answer	
	(b)	void count_alpha() { int count =0; char word[20]; ifstream inf **(“**coordination.txt”); inf>>word; if(isalpha(word[1]) { if (word[1])==’a’|| word[1])==’e’|| word[1])==’i’|| word[1])==’o’|| word[1])==’u’) count++; } cout<<count; inf.close(); //ignored } ***(½ mark for opening the file in ‘in’ mode)*** ***(½ mark for initializing the variable for counting words to 0)*** ***(½ mark for correct comparision)*** ***(½ mark for incrementing and displaying/returning value of variable)***	
	(c)	//Function to copy records from SPORTS.DAT to Swimming.DAT void SPORTS_2_SWIMMING() { Sports S; fstream INF(“SPORTS.DAT”,ios::binary|ios::in); fstream OUTF(“SWIMMING.DAT”,ios::binary|ios::out); while(INF) { INF.read((char*) &S,sizeof(S)); if(strcmp(S.Event,” SWIMMING”)==0)	

		OUTF.write((char *)&S,sizeof(S)); } INF.close(); OUTF.close(); } ***(½ Mark for opening each file in the correct mode)*** ***(½ Mark for reading the content from the file)*** ***(½ Mark for the correct loop)*** ***(½ Mark for the correct comparison with "***SWIMMING***")*** ***(½ Mark for writing the content to the second file)***	
5.	(a)	A Candidate key is the one that is capable of becoming primary key i.e. A candidate key which is not primary key is alternate key. (**2 marks for correct difference)**	
	(b)	(i) Select TEACHERNAME, PERIODS from SCHOOL where PERIODS<25; (ii) Select TEACHERNAME, CODE, DESIGNATION from SCHOOL , ADMIN where SCHOOL.CODE=ADMIN.CODE and GENDER="MALE"; (iii) SELECT COUNT(*) from SCHOOL group by SUBJECT; (v) SELECT CODE, TEACHERNAME, SUBJECT from SCHOOL where DOJ>'01-Jan-1999'; **(1 mark for correct each query)** **(vi)** **Max(Experience)** **Subject** 10 English 16 Physics 15 Maths 5 Chemistry **(vi)** **TEACHERNAME** **GENDER** PRIYA RAI FEMALE LISA ANAND FEMALE **(vii)** **DESIGNATION** **COUNT (*)** VICE PRINCIPAL 1 (vii) 4 **(½ mark for each correct answer)**	
6	(a)	**(X + Y)' = X' . Y'**	

		OR **(X . Y)' = X' + Y'** **Verification:** **(X+Y)' = X' . Y'** **If (X+Y)' . (X+Y) = (X' . Y') . (X+Y)** **If 0 = X' . Y' . X + X' . Y' . Y** **If 0 = 0 + 0** **Hence Proved and Verified** ***(1 Mark for stating any one of the De Morgan's Law)*** ***(1 Mark for verifying any one of the De Morgan's Law)***	
	(b)	F= (A'.B)+(A.B)+(B'.C)	
	(c)	(X+Y+Z). (X+Y+Z'). (X'+Y+Z). (X'+Y'+Z). (X'+Y'+Z') (1 mark for correct answer)	
	(d)	(1 mark each for drawing correct K-Map and plotting 1's correctly) (1 mark for correct grouping) (1 mark for correct answer) The simplified Boolean Expression is F(a,b,c,d)=b'd'+a'c'+ab'+a'bd+acd'	
7	(a)	i. FTP = File transfer Protocol **(½ mark)** ii. PAN = Personal Area Network **(½ mark)**	
	(b)	**Cookies :** Cookies are messages that a web server transmits to a web browser so that the web server can keep track of the user's activity on a specific web site. **1 mark**	
	(c)	(i) A **computer virus** is a computer program that can copy itself and infect a computer. (ii) **Computer Worm** A **computer worm** 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. (1 mark for correct answer)	
		Ease and West Public Ltd has decided to network all its offices spread in five building as shown below: Cable layout  1 mark Or 1 mark for any other correct layout.	

		(i) *Building3. According to the 80:20 rule, building having more number of computers should be selected for installing server.* ***(1 mark for correct answer)*** (ii) *Switch* ***(1 mark for correct answer)*** (iii) Optical Fiber ***(1 mark for correct answer)***	
	(e)	Website : a location on net server Web browser: a software to find the website **(½ mark for each correct definition)**	
	(f)	Cyber law restricts unauthorised usage of internet resources. **(1 mark)**	
	(g)	(iii) **FLOSS**: **F**ree **L**ibre and **O**pen **S**ource **S**oftware: is software which is both free as well as open source software. (iv) **OSI**: **O**pen **S**ource **I**nitiative: An organization dedicated to cause of promoting open source software. (v) **(½ mark for each correct definition)**	