

**KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION**  
**COMPUTER SCIENCE(083)**

**CLASS XII**

**TIME: 3 HOURS**

**MAX.MARK: 70**

*General Instructions-* (i) All questions are compulsory  
(ii) Programming Language: C++

- 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? (2)
- (b) Which C++ header file(s) will be essentially required to run/execute the following C++ code? (1)
- ```
void main()
{
    int Rno=465;
    char SName[]="Ajay Bhaskar";
    cout<<setw(6) <<Rno<<setw(25)<<SName<<endl;
}
```
- (c) Rewrite the following program after removing the syntactical errors (if any). Underline each correction. (2)
- ```
#include<iostream.h>
struct Screen
{ int C, R;}
void ShowPoint(Screen P)
{
    cout<<P.C, P.R<<endl;
}
void main()
{
    Screen Point1 = (5, 3);
    ShowPoint(Point1);
    Screen Point2= point1;
    C.Point1+= 2;
    Point1.R = Point1.R + 2;
}
```
- (d) Find the output of the following program: (3)
- ```
#include<iostream.h>
void ChangetheContent(int Arr[], int Count)
{
    for(int C=0; C<Count; C++)
        Arr[C]= Arr[Count - C- 1];
}
void main()
{
```

```
int A[]={ 1, 2, 3}, B[] = {20, 30, 40, 50}, C[]={ 100, 200};
ChangetheContent(A,3);
ChangetheContent(B,4);
```

```
ChangetheContent(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;
}
```

- (e) Give the output of the following program (Assuming that all required header files are included in the program) (2)

```
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);
}
```

- (f) Study the following program and select the possible output from it: (2)

```
#include<iostream.h>
#include<stdlib.h>
const int LIMIT = 4;
void main()
{
    randomize();
    int Points;
    Points= 100 + random(LIMIT);
    for(int P=Points; P>=100; P--)
        cout<<P<<'#';
    cout<<endl;
}
```

- (i) 103#102#101#100#
- (ii) 100#101#102#103#
- (iii) 104#103#102#101#
- (iv) 103#102#101#100

2 (a) What is copy constructor and parameterized constructor? Illustrate with an example. (2)

(b) Answer the questions (i) and (ii) after going through the following class: (2)

```
class mammal{
public:
char category[20];
mammal( char xname[]) // function1
{
strcpy(category, xname)
}
mammal(mammal &t); //function2
};
```

- (i) Create an object, such that it invokes function1.
- (ii) Write complete definition for function2.

(c) Define a class Sports in C++ with following descriptions: (4)

Private members:

- S\_Code of type long
- S\_Name of type character array (String)
- Fees of type integer
- Duration of type integer

Public members:

- 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:

| S_Name       | Fees |
|--------------|------|
| Table Tennis | 2000 |
| Swimming     | 4000 |
| Football     | 3000 |

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

(d) Consider the following declarations and answer the questions given below: (4)

```
class NATION
{
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.
- (ii) Name the data member(s) that can be accessed from function DISPLAY ().
- (iii) Name the member function(s) which can be accessed from the objects of class STATE.
- (iv) Is the member function OUTPUT() accessible by the objects of the class WORLD.

3 (a) Consider the following structure: (2)

```

struct Employee
{
    int ECode;
    char Ename[20];
};

```

Write a function to accept an Employee array and perform insertion sort in the increasing order of ECode.

- (b) 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. (3)
- (c) 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. (4)
- (d) 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. (3)
- (e) Evaluate the following postfix expression using a stack and show the contents of the stack after each operation. (2)  
100, 40, 8, +, 20, 10, -, +, \*

4 (a) 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. (1)

```

#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( );
}
```

- (b) Write a function to count and print the number of complete words as “to” and “are” stored in a text file “ESSAY.TXT”. (2)

```
void CWORDS( )
{ ifstream fin("ESSAY.TXT");
char st[80];
int count=0;
while(!fin.eof())
{
    fin>>st;
    if(!fin)
    break;
    if(strcmpi(st,"to") = =0 || strcmpi(st,"are")= =0)
    count++;
}
cout<<"\nTotal 'to' & 'are' words = "<<count;
fin.close( ); }
```

- (c) 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: (3)

```
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;
  }
};

```

- 5 (a) What do you understand by the terms Alternate key and Foreign Key of a relation? (2)
- Consider the following tables SCHOOL and ADMIN. Write SQL commands for the statements (i) to (6) (6)
- (iv) and give outputs for SQL queries (v) to (viii).

#### 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

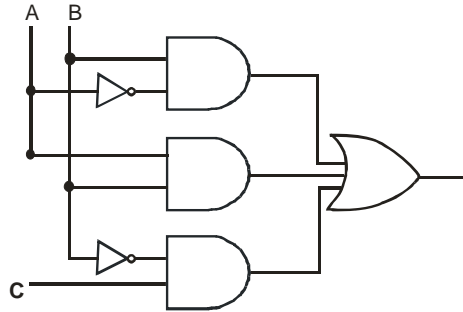
| CODE | GENDER | DESIGNATION    |
|------|--------|----------------|
| 1001 | MALE   | VICE PRINCIPAL |
| 1009 | FEMALE | COORDINATOR    |
| 1203 | FEMALE | COORDINATOR    |
| 1045 | MALE   | HOD            |
| 1123 | MALE   | SENIOR TEACHER |
| 1167 | MALE   | SENIOR TEACHER |
| 1215 | MALE   | HOD            |

- 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 number of teachers in each subject wise.
- 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) Verify  $X'Y + XY' = (X' + Y')(X + Y)$  algebraically. (2)  
 (b) Convert the following Boolean expression into its equivalent Canonical Product of Sum form: (1)

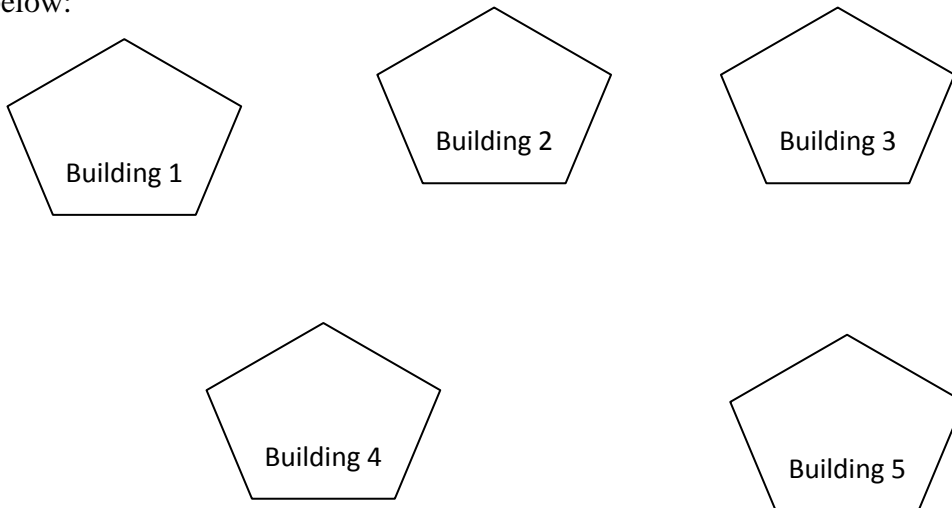
$$X.Y'.Z + X'.Y.Z + X'.Y.Z'$$

- (c) Write the equivalent Boolean Expression F for the following *circuit diagram* : (2)



- (d) Reduce the following Boolean Expression using K-map: (3)  
 $F(X, Y, Z, W) = \Sigma(0,1,3,4,5,7,9,10,11,13,15)$

- 7 (a) Define the term Bandwidth. Give any one unit of Bandwidth. (1)  
 (b) Difference between PAN and LAN. (1)  
 (c) What is iMAP? (1)  
 (d) Compare VB Script and ASP. (1)  
 (e) Ease and West Public Ltd has decided to network all its offices spread in five building as shown below: (4)



The distance between various buildings is as follows:

|                          |      |
|--------------------------|------|
| 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 |

Number of Computers in each building:

|            |     |
|------------|-----|
| Building 1 | 40  |
| Building 2 | 45  |
| Building 3 | 110 |
| Building 4 | 60  |
| Building 5 | 70  |

- (i) Suggest a cable layout for connecting all the buildings together.
  - (ii) Suggest the most suitable building to install the server of the organization with a suitable reason.
  - (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?
  - (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).
- (f) Difference between Virus and Trojan (1)
- (g) Expand FSF and GNU. (1)

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