COMPUTER SCIENCE (Theory)
Class-XII

Time Allowed: 3hours   *Maximum Marks: 70*

Note.   (i) All questions are compulsory.
(ii) Programming Language: C++

Ques. 1

a) What do you mean by free store with reference to memory allocation in c++?   1

b) How **#define** different from **const** explain ?   1

c) Which C++ header file(s) will be essentially required to be included to run / execute the following C++ code?   1

```
void main( )
{
int rno=24;  char name[ ]="Anil Singhal";
cout<<setw(10) <<rno<<setw(20) << name<<endl;
}
```

d) Rewrite the following program after removing syntactical error(s) if any. Underline each correction.   2

```
#include "iostream.h"
class MEMBER
{
int Mno;
float Fees;
PUBLIC:
void Register ( )
{cin>>Mno>>Fees;}
void Display( )
{cout<<Mno<<" : "<<Fees<<endl;}
};
void main( )
{
MEMBER delete;
Register();
delete.Display();
}
```

e)   Give the output of the following program segment (Assuming all required header files are included in the program):   3

```
# include<iostream.h>
# include<ctype.h>
void change (char* state, int  &s)
        {       int b = s;
                for (int x = 0; s>=0; x++, s--)
                if ((x+s)%2)
                *(state+x) = toupper(*(state+b-x));
        }
```

```cpp
void main ( )
{
        char s[ ] = "Punjab";
        int b = strlen (s)−1;
        change (s, b);
        cout<<s<<"#"<<b;
}
```

f) Find the outpu t of the following program.   2

```cpp
# include<iostream.h>
# include<ctype.h>
#include<string.h>
void string_func (char* str)
     {
    int i, j, len=strlen (str);
    for (i =0; i< len; i++)
    {
    for( j=0;j<=i; j++)
      cout<<str[i];
    cout<<endl;
    }
    }
    void main ( )
    {
    string_func("CALIFORNIA");
    }
```

g) In the following program, find the correct possible output(s) from the options. Justify your answer.   2

```cpp
#include<iostream.h>
#include<stdlib.h>
void main( )
{
randomize( );
int p=99,q=999;
int x=random(3)+4;
int y=random(2)+2;
for(int i=0;i<x;i++)
cout<<'#';
cout<<p<<'-';
for(i=0;i<y;i++)
cout<<'@';
cout<<q<<endl;
}
```

      i. ##99-@999

     ii. ##99-@@999

    iii. ######99-@@999

    iv. ####99-@@@

Ques. 2

a) When will you make function inline and why?   2

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

```
class Inter
{ int m;
public:
   Inter( int  y) { m = y; }        // Function 1
   Inter ( Inter & t );             // Function 2
   ~Inter( ) {  }                   // Function 3
};
```

    (i) a) Create an object, such that it invokes Function 1.

        b) What is Function 3?

    (ii) Write complete definition for Function 2.

c) Define a class Competition in C++ with the following descriptions: 4

Private Members:

Event_no	integer
Description	char(30)
Score	integer
Qualified	char
Award(int)	To award qualified as 'Y', if score is more than the cut off score passed as argument to the function else 'N'.

Public Members:

- A constructor to assign initial values Event_No as 101, Description as "State level", Score is 50 and Qualified as 'N'
- Input( ), To take the input for Event_no, Description and Score and call the function Award( ).
- Show( ), To display all the details.

d) Answer the questions (i)to (iv) based on the following: 4

```
class FacetoFace
{
char CenterCode[10];
public:
void Input( );
void Output( );
};
class Online
{
char Website[50];
public:
void Sitein( );
void Siteout( );};
class Training : public FacetoFace, private Online
{
long Tcode;
float Charge;
int Period;
```

public:

void Register( );

void Show ( );

};

(i)   Which type of inheritance is shown in the above example?

(ii)   Write names of all member functions accessible from Show( ) function of class Training.

(iii)   Write names of all the members accessible through an object of class Training.

(iv)   Is the function Output( ) accessible inside the function SiteOut( )? Justify you answer.

Ques. 3

a) Write a function SORTSCORE() in C++ to sort an array of structure Examinee in descending order of Score using Bubble Sort.   3

       Note : Assume the following definition of structure Examinee.

       struct Examinee

       { long RollNo;

       char Name[20];

       float Score;

       };

b) An array T[35][15] is stored in the memory along the row with each element occupying 4 bytes. Find out the base address and address of element T[20][5], if an element T[2][2] is stored at the memory location 3000.   3

c) Write a function FindPlayer( ) in C++ to find & display the record of a player from a dynamically allocated Queue implemented with the help of following structure. The function will receive the Front, Rear and the player ID to be search from Queue as arguments. (Assume the queue is already created with some elements.)   4

       struct Cricket

      {   int Pid;   // Player ID

         char Pname[20]; // Player Name

         char Type[20];   // Batsman or Bowler or Keeper or Others

       Cricket *next;

      }*Front, *Rear;

d) Write a function **SumOfAlternate**( ) in C++ to find and return the sum of elements from all alternate elements of a two dimensional array passed as argument with size, starting from [0][0]. For eg   2

<div align="center">If the following is the content of the array</div>

B[0][0]	B[0][1]	**B[0][2]**
4	5	**1**
B[1][0]	**B[1][1]**	B[1][2]
2	**8**	7
B[2][0]	B[2][1]	**B[2][2]**
9	6	**3**

       The function should add elements B[0][0], B[0][2], B[1][1], B[2][0] and B[2][2].

e) Convert the following infix expression to its equivalent postfix expression Showing stack contents for the conversion: 2

    (A+B)*(C^(D-E)+F)-G

Ques. 4.

a) Observe the program segment given below carefully and fill the blanks marked statement 1 and statement 2.   1

```cpp
class PracFile
{    int Pracno;
     char PracName[20];
     int TimeTaken;
     int Marks;
  public:
     void EnterPrac( );          // function to enter PracFile details
     void ShowPrac( ):           // function to display PracFile details
     int RTime()                 // function to return TimeTaken
     { return TimeTaken; }
     void Assignmarks (int M) // function to assign Marks
     { Marks = M;  }
};
void AllocateMarks( )
{   fstream File;
    File.open("MARKS.DAT",ios::binary|ios::in|ios::out);
    PracFile P;
    int Record = 0;
    while (File.read(( char*) &P, sizeof(P)))
    {
     if(P.RTime( )>50)
        P.Assignmarks(0)
     else
        P.Assignmarks(10)
     _____ //statement 1
     _____ //statement 2
      Record + + ;
    }
   File.close();
}
```

If the function AllocateMarks ( ) is supposed to Allocate Marks for the records in the file MARKS.DAT based on their value of the member TimeTaken. Write C++ statements for the statement 1 and statement 2, where, statement 1 is required to position the file write pointer to an appropriate place in the file and statement 2 is to perform the write operation with the modified record.

b) Assume a text file "coordinate.txt" is already created. Using this file create a C++ function to count the number of words having first character capital .Also count the presence of a word 'Do'.

Example: **2**

Do less Thinking and pay more attention to your heart. Do Less Acquiring and pay more Attention to what you already have. Do Less Complaining and pay more Attention to giving. Do Less criticizing and pay more Attention to Complementing. Do less talking and pay more attention to SILENCE.

Output will be : Total words with capital vowel - 16

Count of 'Do' in file - 5

c) Given a binary file "BUS.DAT", containing records of the following class bus type.   3

```cpp
class bus
{       int bus_no;
        char desc[40];
        int distance;           //in km
    public:
        void read( )
        {       cin>>bus_no; gets(desc) ; cin>>distance;     }
        void display( )
        {       cout<<bus_no; puts(desc); cout<<distance;   }

        int retdist( )
        {       return distance;         }
};
```

Write a function in C++ that would read the contents of file "BUS.DAT" and display the details of those buses which travels the distance more than 100 km.

Ques. 5

a) What are DDL and DML Commands? Give one example of each.   2

b) Consider the following tables Stationary and Consumer. Write SQL commands for the statement (i) to (iv).   4

Table: Stationary

S_ID	StationaryName	Company	Price
DP01	Dot Pen	ABC	10
PL02	Pencil	XYZ	6
ER05	Eraser	XYZ	7
PL01	Pencil	CAM	5
GP02	Gel Pen	ABC	15

Table: Consumer

C_ID	ConsumerName	Address	S_ID
01	Good Learner	Delhi	PL01
06	Write Well	Mumbai	GP02
12	Topper	Delhi	DP01
15	Write & Draw	Delhi	PL02
16	Motivation	Bangalore	PL01

(i)   To display the details of those consumers whose Address is Delhi.

(ii)   To display the details of Stationary whose Price is in the range of 8 to 15. (Both Value included)

(iii)   To display the ConsumerName, Address from Table Consumer, and Company and Price from table Stationary, with their corresponding matching S_ID.

(iv)   To increase the Price of all stationary by 2.

c) Write the output for SQL queries (v) to (viii):   2

(v)   SELECT DISTINCT Address FROM Consumer;

(vi)   SELECT Company, MAX(Price), MIN(Price), COUNT(*) from Stationary GROUP BY Company;

(vii) SELECT Consumer.ConsumerName, Stationary.StationaryName, Stationary.Price FROM Strionary, Consumer WHERE Consumer.S_ID=Stationary.S_ID;

(viii) Select StationaryName, Price*3 From Stationary;

Ques.6

a) Verify the following algebraically   2
    (A'+B').(A+B)=A'.B+A.B'

b) Draw a logical Circuit Diagram for the following Boolean Expression: 2
        A.(B+C')

c) Write the equivalent Canonical Sum of Product for the following Product of Sum   1
    Expression: F(X,Y,Z)= $\prod(1,3,6,7)$

d) If F (X, Y, Z, W) = Σ (0,1,3,4,5,7,9,10,11,13,15) obtain the simplified form using K-Map.   3

Ques.7

a) What was the role of ARPANET in the Computer Network?   2

b) Define the term Bandwidth. Give any one unit of Bandwidth.   1

c) Write the full forms of the following: 1
    (i) FTP   (ii) NTP

d) "Vidya for All" is an educational NGO. It is setting up its new campus at Jaipur for its web based
    activities. The campus has four buildings as shown in diagram below: 4
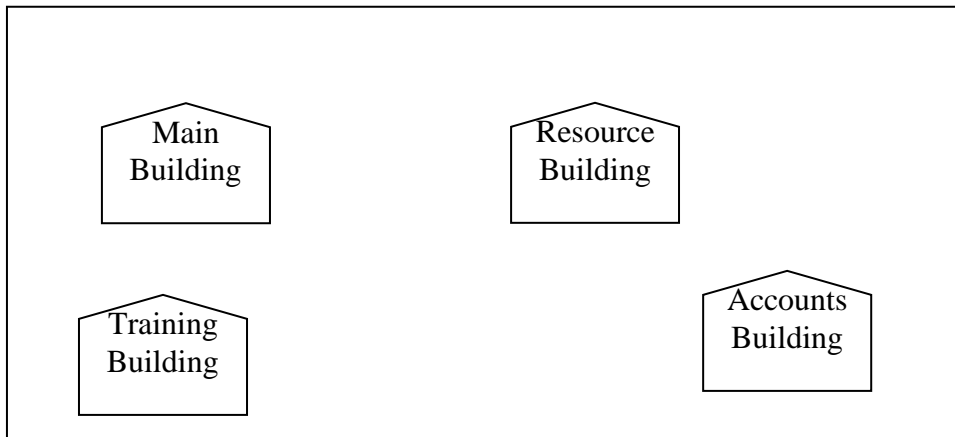
 Center to center distances between various buildings as per architectural drawings (in meters) is as
follows:

Main Building to Resource Building	120m
Main Building to Training Building	40m
Main Building to Accounts Building	135m
Resource Building to Training Building	125m
Resource Building to Accounts Building	45m
Training Building to Accounts Building	110m

Expected number of Computers in each building is as follows:

Main Building	15
Resource Building	25
Training Building	250
Accounts Building	10

(i)   Suggest a cable layout of connection between the buildings.

(ii)   Suggest the most suitable place(i.e building) to house the server of this NGO. Also
        provide a suitable reason for your suggestion.

(iii)   Suggest the placement of the following devices with justification:

       i.   Repeater
      ii.   Hub/Switch
(iv)   The NGO is planning to connect its International office situated in Delhi. Which out of following wired communication links, will you suggest for very high speed connectivity?

    i) Telephone Analog Line   ii) Optical Fibre   iii) Ethernet Cable

e) What are cookies?   1

f) What do you mean by FLOSS?   1

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