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Class : XII   **SAMPLE PAPER**   **Max Marks : 70**

Subject : Computer Science   **Time Allotted : 3 hrs**

General Instructions :

Programming Language : **C++.**

All questions are compulsory

1. (a) What is the difference between #define and constant int?
    Also, give a suitable C++ code to illustrate both.   2

(b) Write the names of the header files, which is/are essentially required to run/execute the following code:1

```
void main ( )
 {
  char Str[ 10];
  gets (Str);
  for (int i=0 ; Str[i] ! ='\0' ;i++)
  if (isupper(Str[i]))
  Str[i]=tolower(Str[i]);
  else
 {   Str[i]=toupper (Str [i]) ;}
  puts(Str);
 }
```

(c) Rewrite the following program after removing the syntactical errors (if any).Underline each correction. 2

```
include<iostream.h>
typedef  String char[20];
void main ( )
 {
 String S= "New String";
 int L=strlen(S) ;
 cout<<S<< 'has'<<L<< 'characters'<<end1;
 }
```

(d) Find the output of the following program: 3

```
#include <iostream.h>
void Move(int arr[ ], int N, int s)
 {
  for (int p=1 ;p<N; p++)
  if (p< s)
   arr[p]+ = p;
 else
  arr [p]- = p;
 }
 Void Output (int Arr [ ], int N)
 {
  for (int p=0 ; p<N ; p++)
  if(p%2==0)  cout<<Arr[p]<<"#";
  else
  cout<<Arr[p]<<endl;
```

```
      }
    void main ( )
    {  int list[ ]= {30,40,50,20,10,5};
       Shift (list, 6, 3);
       Display (list, 6);
    }
```

(e) Find the output of the following program: 2
```
#include<iostream.h>
void main ( )
{
   char *K, Moves [ ] = "Demonitisation";
   K = Moves;
   Moves [2] + = 5;
   cout<< "K @"<<*K<<endl;
   *K - = 11;
   K + = 2;
   cout<< "Now @"<<*K<<endl;
   K++;
   cout<< "Finally@"<<*K<<endl;
   cout<< "New Origin @"<<Moves[0]<<endl;
}
```

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested
Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the
variable Num.   2
```
#include<iostream.h>
#include <stdlib.h>
void main ( )
{
   randomize ( ) ;
   int Num, Max=5;
   Num = 20 + random (Max) ;
   for (int N=Num; N<=25;N++)
   cout<<N<<"&";
}
```
   (i) 20&21&22&23&24&25&
   (ii) 22&23&24&25&
   (iii) 23&24&
   (iv) 21&22&23&24&25

2. (a) Define Copy constructor function with respect to Object Oriented Programming. Write the
      significance of default constructor.   2
(b) Answer the questions (i) and (ii) after going through the following class: 2
```
   class Hospital
   { int Pid , Did;
     public:
     Hospital(int P); //Function 1
     Hospital();  // Function 2
     Hospital(Hospital&C);  //Function 3
     void Admit();  //Function 4
     void Discharge( );  //Function 5      };
   main( )
```

{ Hospital Apollo[20]; // Statement 1
}
   (i).Which of the functions out of Function 1,2,3,4 or 5 will get executed when the Statement 1 is executed in the above code?
   (ii).Write a statement to declare a new object HealthCare with reference to already existing object A using function 3?
 (c) Define a class **Student** in C++ with following description: 4
Private Members
_ A data member ENo (Examination Number) of type long
_ A data member Name of type string
_ A data member Agg (Aggregate Marks) of type float
_ A data member Grade of type char
_ A member function FindGrade() to find the Grade as per the Aggregate Marks obtained by a Examinee. Equivalent Aggregate Marks range and the respective Grades are shown as follows:

Aggregate Marks	Grade
>=80	A
less than 80 and >=65	B
less than 65 and >=50	C
less than 50	D

Public Members
_ A function ENTER() to allow user to enter values for ENo, Name, Agg & call function FindGrade() to find the Grade.
_ A function QUALIFIED( ) to allow user to view the content of all the data members.
(d) Answer the questions (i) to (iv) based on the following: 4
class Candidates
{
   int Regno:
   char CName[20];
  float QMarksl;
  protected:
  void Qualified ( ) ;
  public:
 Cadets ( ) ;
 void Enroll ( ) ;void Display ( ) ;
 } ;
class Commander
{
  long CCode;
 char CName [20];
 protected:
 float Salary;
 public:
 Commander ( );
 void Enter ( ) ;
 void Show ( ) ;
 } ;
class Batalion: public Candidates, private Commander
{
  long CCode [10]; char CourseName [50];
  char StartDate [8] , EndDate [8];
  public:

Course ( ) ;
  void Commence ( );
  void CDetail ( ) ;   } ;
(i) Write the names of member functions, which are accessible from objects of class Batalion.
(ii) Write the names of all the data members, which are accessible from member function Commence of
     class Batalion.
(iii)Which type of inheritance is shown in the above example?
(iv)Which type of Inheritance is illustrated in the above C++ code?

3. (a) Write a split() function in C++ to transfer the content from one array A[ ] to two different arrays O[ ]
and E[ ]. The Odd[ ] array should contain the values from odd positions (1,3,5,...) of A[ ] and E [ ] array
should contain the values from even positions (0, 2, 4,…..) of A [ ].   3
Example
If the A[] array contains
12, 34, 56, 67, 89, 90
The O[] array should contain
34, 67, 90
And the E [] array should contain
12, 56, 89
(b) An array LIST[50][20] is stored in the memory along the row with each of its elements occupying 8
    bytes. Find out the location of LIST[10][15], if LIST[0][0] is stored at 4200.   3
(c) Write a function in C++ to perform Insert operation on a dynamically allocated Queue containing
    Members details as given in the following definition of NODE: 4
    struct NODE
    {
     long Mno //Member Number
     char Mname[20]; //Member Name
     NODE &Link;
    };

(d) Write a Digonal( ) function in C++ to find sum of all the elements on the Diagonal from a
    NxN Matrix. (Assuming that the N is a odd number)   2
(e) Evaluate the following postfix notation of expression: 2
    True, False, NOT, AND, True, True, AND,OR
4. (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and
    Statement 2 using seekg( ), seekp( ) tellp( ) and tellg( )functions for performing the required task.   1
#include <fstream.h>
class article
{   int Ano;char Aname[20]; float Price;
    public:
    void ModifyPrice() ;//The function is to modify price of a particular ARTICLE } ;
  void article: :ModiyPrice()
 { fstream File;
   File.open ("ARTICLE.DAT", ios::binary | ios::in | ios: :out) || ;
   int CAno;
   cout<<"Article No to modify price:";cin>>CAno;
   while (file.read ((char&) this, sizeof (ARTICLE)))
   { if (CAno==Ano)
   {   cout<<"Present Price:"<<Price<<end1;
   cout<<"Changed price:"; cin>>Price;
   long FilePos = _____ ; //Statement 1,

```
                    ; //Statement 2
   File.write((char&)this,sizeof(ARTICLE)) ;
   // Re-writing the record   }   }
   File.close ( ) ;
 }
```
(b) Write a function in C++ to count the no. of "the" or "this" words present in a text file "Story. TXT"
   If the file "Story. TXT" content is as follows: 2
   Amit is playing in the ground. Rani is Playing with this dolls.
   The output of the function should be
   Count of the/this in file: 2

(c) Write a function in C++ to search for a TAB from a binary file "Gadget.DAT" containing the objects of class" TAB (as defined below). The user should enter the Model No and the function should search and display the details of the TAB.   3

```
class TAB
{
  long ModelNo;
  char make[20];
  int Zoom;
  char Details[120];
  public:
  void Enter ( ) {cin>>ModelNo; gets(make); cin>>Zoom; gets(Details);}
  void Display ( )
  {cout<<ModelNo<<make<<Zoom<<Details<<endl;}
  long GetModelNo ( ) {return ModelNo;}
};
```

5. (a) What do you understand by Selection & Projection operations in relational algebra?   2
       Consider the following tables ESHOP and ITEM and answer (b) and (c) parts of this
question:

Table: Computer shop

ID	Name	Address
E001	Amita computronics	Karelibagh
E002	Tech Services	O P Road
E003	Zeon	O P Road
E004	Lynx Communication	AB Complex
E005	Param Computers	Naya Bazar

Table: ITEM

INo	IName	Price	ID
I01	Mother Board	10000	E001
I02	Hard Disk	5000	E002
I03	Mouse	300	E002
I04	Mother Board	14000	E004
I05	LCD	7000	E003
I06	Hard Disk	12000	E005
I07	Mouse	350	E004

(b) Write SQL queries for the following: 4
 (i) To print all the details of the items with price more than 5000.
 (ii) To count the number of shops in the table ComputerShop.
 (iii) To display the item name of the item with maximum price.
 (iv) To increase the price of mouse by 50 in the table ITEM.
 (c) Write the output of the following SQL queries: 2
 (i)   Select IName from ITEM ,ESHOP where ITEM.ID=ComputerShop.ID;

(ii) Select count(*) from ITEM;
(iii) Select IName , Price from ITEM order by Price Desc;
(iv) Select MAX(Price) from ITEM where IName ="Mother Board";

6 (a) Verify the following using Truth Table: 2
     X+Y. Z=(X+Y).(X+Z)
(b) Draw the logic circuit for the following Boolean expression: 2
   AB'+A'C+A'B'C
(c) Write the SOP form of a Boolean function F, which is represented in a truth table as follows: 1

U	V	W	F
0	0	0	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map: 3
$F(a,b,c,d) = \Sigma (0,1, 2, 4, 5, 6, 7, 8, 10)$
7. (a) Differentiate between HTML and XML   .   1
(b) Differentiate between HTTP and FTP.   1
(c) Give one advantage of using Star Topology.   1
(d) Out of the following, identify client side script (s) and server side script (s).   1
(i) Javascript   (ii) ASP   (iii) vbscript   (iv) JSP
(e) Great Studies University is setting up its Academic schools at Sunder Nagar and planning to set up a
network. The university has 3 academic schools and one administration center: 4
Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

(i) Suggest the most suitable place (i.e. School/Center) to install the server of this university with a suitable
    reason.
(ii) Suggest an ideal layout for connecting these schools/ center for a wired connectivity.
(iii) Which device will you suggest to be placed/installed in each of these schools / center to efficiently
     connect all the computers within these schools / center?
(iv) The university is planning to connect its admission office in the closest big city, which is more than
     350   km from the university. Which type of network out of LAN, MAN or WAN will be formed?
     Justify your answer.
(f) What is the difference between   3G and 4G.   1
(g) What are cookies?   1

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