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**INDIAN SCHOOL MUSCAT
FIRST PRELIMINARY EXAMINATION
SUBJECT : COMPUTER SCIENCE**

CLASS: XII
14.12.2017

Sub. Code: 083

Time Allotted: 3 Hrs
Max. Marks: 70

General Instructions:

- i) All questions are compulsory.
- ii) Programming Language : C++
- iii) Assume all header files are included in the output questions.

1. a) Write the names of the header files, which is/are essentially required to run/ execute the following C++ code: 1

```
typedef char STRING[80];  
void main()  
{  
    STRING Txt[] = "We love Peace"; int Count=0;  
    while (Txt[Count]!='\0')  
    {  
        if (isalpha(Txt[Count]))  
            Txt[Count++] = '@' ;  
        else  
            Txt[Count++] = '#' ;  
    }  
    puts (Txt);  
}
```

- b) What is the benefit of giving default parameter/argument in a function? Give a suitable example to illustrate its use. 2

- c) Observe the following C++ code and find out , which out of the given options i) to iv) are the expected correct output. Also assign the maximum and minimum value that can be assigned to the variable 'Taker'. 2

```
void main( )  
{  
    int GuessMe[4] = {100, 50, 200, 20} ;  
    int Taker = random(2) + 2 ;  
    for( int Chance = 0 ; Chance <=Taker ; Chance++)  
        cout<<GuessMe[Chance]<< "#"  
    }  
}
```

- i. 100 # ii. 50#200# iii. 100#50#200# iv. 100#50

- d) Rewrite the following code after removing all the syntax error(s) if any present in the code. Make sure that you underline each correction done by you in the code. Assume that all required header files are already included, which are essential to run this code 2

```
#Define MaxSpeed = 60.5;
void main()
{
    int MySpeed ;
    char Alert='N' ;
    cin»MySpeed ;
    if MySpeed > MaxSpeed
        Alert = 'Y' ;
    cout<<Alert<<endl;
}
```

- e) Find the output of the following program: 3

```
class Eval
{
    char Level;
    int Point;
public:
    Eval() { Level = 'E' ; Point = 0; }
    void Sink(int L)
    {
        Level -= L;
    }
    void Float(int L)
    {
        Level += L;
        Point++;
    }
    void Show()
    {
        cout<<Level<< "#" << Point<<endl;
    }
};
void main()
{
    Eval E;
    E.Sink(3);
    E.Show();
    E.Float(7);
    E.Show();
    E.Sink(2);
    E.Show();
}
```

2. a) Mention any two advantages of OOPs. 1

- b) What do you mean by Inheritance and Polymorphism? 2
- c) What is the difference between a class and an object? 2
3. What is function overloading? Explain with an example. 2
4. Define a class **BUS** in C++ with the following specification : 4

Private Members :

- A data member Busno (to store bus number) of type integer.
- A data member From (to store place name of origin) of type string.
- A data member To (to store place name of destination) of type string.
- A data member Type (to store bus type such as 'O' for ordinary) of type char.
- A data member Distance (to store the distance in KM) of type float.
- A data member Fare (to store the bus fare) of type float.

Public members:

A constructor to assign default values to data members: Busno=1222, From -"Delhi", To- "Amritsar", Type - 'O' , Distance = 1100 , Fare = 1650

A member function CalcFare() to allow users to calculate the fare as per the following criteria:

Type	Fare
'O'	1.5 * Distance
'E'	2.5 * Distance
'L'	3.5 * Distance

A member function Allocate() to allow user to enter values for Busno, From, To,Type and Distance.

A member function Display() which calls the function CalcFare() and display all the details.

5. Answer the questions(i) and (iii) after going through the following class: 3

```
class Passenger
{ long int PNR;
  char Name[20] ;
public:
  Passenger( ) // Function 1
  { cout<<"Ready"<<endl; }

  void Passengr(long P,char N[ ] ) // Function 2
  { PNR = P; strcpy(Name, N); }

  void Print( ) // Function 3
  { cout<<PNR << Name <<endl; }

  ~Passenger( ) // Function 4
  { cout<<"Booking cancelled!"<<endl; }
};
```

- i) Write suitable C++ statements to invoke Function 2.
- ii) Write suitable C++ statement to invoke Function 3.
- iii) What is Function 4 referred as? When will it be invoked?

6. Answer the questions (i) to (iv) based on the following:

4

```
class Interior
{
    int OrderId ;
    char Address[20] ;
protected:
    float Advance;
public:
    Interior() ;
    void Book() ;
    void View() ;
};
class Painting : public Interior
{
    int WallArea, ColorCode ;
protected:
    char Type;
public:
    Painting() ;
    void PBook() ;
    void PView() ;
};
class Billing : public Painting
{
    float Charges;
    void Calculate() ;
public:
    Billing() ;
    void Bill() ;
    void BillPrint() ;
};
```

- i) Which type of Inheritance out of the following is illustrated in the above example?
 - Single Level Inheritance
 - Multi Level Inheritance
 - Multiple Inheritance
- ii) Write the names of all the data members, which are directly accessible from the member functions of class Painting.
- iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.

iv) What will be the order of execution of the constructors, when an object of class Billing is declared?

7. a) Write a function definition for TOWER() in C++ to read the content of a text file WRITEUP.TXT to count the presence of the word TOWER and display the number of occurrences of this word. 2

Note:

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case).

b) Write a definition for function COSTLY() in C++ to read records of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below: 3

```
class GIFTS
{
    int CODE; char ITEM[20] ; float PRICE;
public:
    void Procure( )
        { cin>>CODE ; gets(ITEM) ; cin>>PRICE ; }
    void View( )
        { cout<<CODE<<": "<<ITEM<<": "<<PRICE<<endl; }
    float GetPrice( ) { return PRICE; }
};
```

c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members: 2

```
class MEMBER
{
    int Mno ; char Name[20] ;
public:
    void In( ) ; void Out( ) ;
};

void main( )
{
    fstream MF;
    MF.open("MEMBER.DAT", ios::binary|ios::in) ;
    MEMBER M;
    MF.read((char*)&M, sizeof( M )) ;
    MF.read((char*)&M, sizeof( M )) ;
    MF.read((char*)&M, sizeof( M )) ;
    int POSITION = MF.tellg( ) / sizeof(M) ;
    cout<< "SIZE OF ONE RECORD="<< sizeof(M) ;
    cout<<"PRESENT RECORD:"<<POSITION<<endl;
    MF.close( ) ;
}
```

8. Find and write the output of the following C++ program code: 2
 Note: Assume all required header files are already being included in the program.

```
void main( )
{ char *Text = "ELLORA" ;
  int *P , NUM [ ]={10,15,18,45}
  P = NUM ;
  cout<< *P << Text << endl ;
  Text++ ;
  P++ ;
  cout<< *P <<Text << endl ;
}
```

9. a) An array T[25][30] is stored in the memory along the row with each of the element occupying 2 bytes, find out the base address and address of element T[10][15], if an element T[5][10] is stored at the memory location 25000. 3
- b) Write a function to sort any array of n elements using exchange selection sort . Array and its size should be passed as argument to the function. 3
- c) Write a definition of a function Reverse(int A[],int N) in C++,which should reverse the entire content of the array A having N elements, without using any other array. 2
 Example: if the array A contains

10	20	35	47	53
----	----	----	----	----

Then the array should become

53	47	35	20	10
----	----	----	----	----

- d) Write a definition for a function ADDMIDROW(int MAT[][10], int R, int C) in C++, which finds the sum of the middle row elements of the MAT (Assuming C represents number of columns and R represents number of rows, which is an odd integer). 2
 Example: if the content of array MAT having R as 3 and C as 5 is as follows:

1	2	3	4	5
2	1	3	4	5
3	4	1	2	5

The function should calculate the sum and display the following:
 Sum of Middle Row: 15

- 10.a) Write the definition of a member function PUSH() for a class BOOKSTORE in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part of the program: 3

```
struct BOOK
{ int bookid;
  char bookname[20];
  BOOK *next;
};
```

```

class BOOKSTORE
{ BOOK *top;
public:
    BOOKSTORE()
    { top = NULL; }
    void PUSH();
    void POP ();
    ~BOOKSTORE();
};

```

- b) Write the definition of a member function INSERT() for a class QUEUE in C++, to insert an item to a dynamically allocated Queue of items considering the following code is already written as a part of the program. 3

```

struct ITEM
{ int ID;
  char INAME[20];
  ITEM *Next;
};
class QUEUE
{ ITEM *R,*F;
public:
    QUEUE(){ R = NULL; F = NULL; }
    void INSERT();
    void DELETE();
    ~QUEUE();
};

```

- c) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2

P + (Q - R) *S / T

- 11.a) Define i) Primary Key ii) Alternate Key 1
- b) What do you mean by selection operation and projection operation in Relational Algebra. 2
- c) Differentiate between Cardinality and Degree. Explain with the help of an example. 2
12. Write SQL commands for the queries (i) to (viii) and output for (ix) to (xii) based on the tables 'SUPPLIERS' and 'PRODUCTS' as given below.

Table: SUPPLIERS

SUPCODE	SNAME	CITY
S01	GET ALL INC	KOLKATA
S03	EASY MARKET CORP	DELHI
S02	DIGI BUSY GROUP	CHENNAI

Table: PRODUCTS

PID	PNAME	QTY	PRICE	COMPANY	SUPCODE
101	DIGI CAMERA	120	12000	RENIX	S01
102	DIGI PAD	100	22000	DIGI POP	S02
104	PEN DRIVE	500	1100	STOREKING	S01
106	LED SCREEN	70	28000	DISPEX	S02
105	CAR GPS	60	12000	MOVEON	S03

- i) To display all the details of all the products in the ascending order of product names. 1
- ii) To display product name and price of all those products, whose price is in the range of 10000-15000 (both inclusive). 1
- iii) To display the number of products, which are supplied by each supcode. 1
- iv) To display the price, product name and quantity of those products which have quantity more than 120. 1
- v) To display all the names of those suppliers, who are either from DELHI or from CHENNAI. 1
- vi) To display the product names starting with the letter 'D'. 1
- vii) To display the average price of a product. 1
- viii) To display all the details of suppliers not from KOLKATA. 1

Obtain the output of the following SQL queries (ix to xii) based on the data given in tables PRODUCT and SUPPLIERS above. 2

- ix) SELECT DISTINCT SUPCODE FROM PRODUCTS ;
- x) SELECT MAX(PRICE), MIN(PRICE) FROM PRODUCTS ;
- xi) SELECT PRICE * QTY FROM PRODUCTS WHERE PID = 104 ;
- xii) SELECT PNAME, SNAME FROM PRODUCTS P, SUPPLIERS S
WHERE P.SUPCODE = S.SUPCODE AND QTY > 100 ;

End of the Question Paper