AMRITA VIDYALAYAM
AMRITA PRE BOARD EXAMINATION 2019 - 20

Class : XII   **Marks : 70**
                                                                                                    Time   : 3 hrs

COMPUTER SCIENCE (283)

1.a)   Write the type of C++ Operators (Arithmetic, Logical, and Relational Operators) from the
following.   **2**

   (i) ==   (ii) || (iii) %   (iv) &&

b)   Observe the following program very carefully and write the name of those header file(s), which
are essentially needed to compile and execute the following program successfully.   **1**

```cpp
void main()
{
       char text;
       gets(text);
       cout<<strlen(text);
}
```

c)   Rewrite the following C++ code after removing any/all syntactical errors with each correction
underlined.   **2**

   Note : Assume all required header files are already included in the program.

```cpp
typedef int check
void main()
{
       check a;b,
       cin>>a>>b;
       cout<<(a+b)<<endline;
}
```

d)   Find and write the output of the following C++ program code.   **3**

   Note : Assume all required header files are already included in the program.

```cpp
void Change(int &Num, int L=2)
{
       L=(L%2==0)?L+1:L-1;
       for(int C=1; C<=L; C++)
       Num+=C;
}
void main()
{
       int A=20,B=4;
       Change(A,B);
       cout<<A<<"&"<<B<<endl;
       B--;
       Change(A,B);
       cout<<A<<"#"<<B<<endl;
       Change(B);
       cout<<A<<"#"<<B<<endl;
}
```

e)   Find and write the output of the following C++ program code.   **2**

   Note : Assume all required header files are already included in the program.

```cpp
void main()
{
       int numbers[]={2,4,8,10};
       int *ptr=numbers;
       for(int C=1;C<3;C++)
       {
```

1 - XII C++

```
                        cout<<*ptr<<"@";
                        ptr++;
                }
        cout<<endl;
        for(C=0;C<4;C++)
                {
                (*ptr)/=2;
                --ptr;
                }
                for( C=0;C<4; C++)
                        cout<<numbers[C]<< "#";
        }
```

f)   Look at the following C++ code and find the possible output(s) from the options (i) to (iv)
     following it.   **2**
     Also, write the highest and lowest values that can be assigned in the array A.
     Note :
     • Assume all the required header files are already being included in the code.
     • The function random(n) generates an integer between 0 and n-1.

```
const int Low=15;
void main()
{
randomize( );
int point=5,number;
for(int i=1;i<=4;i++)
        {
        number= Low+ random(point);
        cout<<number<<":" ;
        point--;
        }
}
```

(i) 19:16:15:18:   (ii) 14:18:15:16:   (iii) 19:16:14:18:   (iv) 19:16:15:16:

2.a)   Answer the questions (i) and (ii) after going through the following class definition.   **2**

```
class Force
{
        int power;
        public:
        Force( int z )          //Constructor 1
        {
                power=z;
        }
        Force(Force &F)    //Constructor 2
        {
                power=F.power;
        }
};
```

(i) What type of constructor is Constructor 2? Explain.
(ii) Write statement to invoke Constructor 2.

b)   Write the output of the following C++ code. Also, write the name of feature of Object Oriented
     Programming used in the following program jointly illustrated by the function[1] to [4].   **2**

```
#include<iostream.h>
void Print( )                    // Function 1
{
for( int k=1;k<=60 ;k++)
        cout<<" - "<<endl;
}
```

2 - XII C++

```
void Print(int N)              // Function 2
{
for( int k=1;k<=N ;k++)
     cout<<" * "<<endl;
}
void Print(int A,int B)        // Function 3
{
for( int k=1;k<=B ;k++)
     cout<<A* k<<endl;
}
void Print(char T,int N)            // Function 4
{
for( int k=1;k<=N ;k++)
     cout<<T<endl;
}
void main( )
{
    int U=9,V=4,W=3;
    char C="#";
    Print(C,V);
    Print(U,W);
}
```

OR

Write any four differences between constructor and destructor function with respect to object oriented programming.

c)   Define a class employee with the following specifications.   **4**

Private members:

empno   int
ename   20 character
basic, hra, da   float
netpay   float

ctotal( ) A function to calculate the total **basic+hra+da** with float return type.

Public members:

Takedata( ) A function to read **empno, ename, basic, hra, da** and invoke **ctotal( )** to calculate total.

Showdata( ) A function to display all the data members on the screen.

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

```
class Product
{
    int code;
    char item[20];
protected:
    float qty;
public:
    Product( );
    void GetIn( );
    void Show( )
};
class Wholesaler
{
    int wcode;
    protected:
    char manager[20];
public:
    Wholesaler( );
    void Enter( );
    void Display( );
```

3 - XII C++

```
};
class Showroom: public Product,private Wholesaler
{
char name[20],city[20];
public:
        Showroom( );
        void Input( );
        void View( );
};
```

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

(ii) Write the names of all the data members, which are directly accessible from the member functions of class Showroom.

(iii) Write the names of all the data members, which are directly accessible by an object of class Showroom.

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

<div align="center">OR</div>

Consider the following class State.

```
class State
{
        protected :
        int tp;
        public :
        State( ) { tp=0;}
        void inctp( ) { tp++;};
        int gettp(); { return tp; }
};
```

Write a code in C++ to publically derive another class 'District'with the following additional members derived in the public visibility mode.

Data Members :

  Dname string

  Distance float

  Population long int

Member functions :

  DINPUT( ) : To enter Dname, Distance and population

  DOUTPUT( ) : To display the data members on the screen

3.a) Write a function Swap2Best (int Arr[], int Size) in C++ to modify the content of the array in such a way that the elements , which are multiples of 10m swap with the value present in the very next position in the array. **2**

Example: If the content of the array Arr is: 90, 56, 45, 20, 34, 54

The content of the array Arr should become: 56, 90, 45, 34, 20, 54

<div align="center">OR</div>

Write the definition of a function `Alter (int A[], int N)` in C++ which should change all the multiples of 5 in the array to 5 and rest of the elements to '—'.

Example: If the content of the array Arr is: 55, 43, 20, 16, 39, 90, 83, 40, 48, 25

The content of the array Arr should become: 5, -, 5, -, -, 5, -, 5, -, 5

b) Write a function REVCOL (int P[][3], int N, int M) in C++ to display the content of a two dimensional array with each column content in reverse order. **3**

If the content of the array is as follows.

15	12	56
13	91	92
11	23	61

<div align="center">4 - XII C++</div>

The function should display output as.

11	23	61
13	91	92
15	12	56

<center>OR</center>

Write a user-defined function EXTRA_ELE (int A[ ], int B[ ], int N) in C++ to find and display the extra element in Array A. Array A contains all the elements of Array B but one element extra. (Restriction: Array elements are not in order)

Example: If the elements of Array A is 14, 21, 5, 19, 8, 4, 23, 11

and the elements of Array B is 23, 8, 19, 4, 14, 11, 5

Then output will be 21.

c) An array S[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of S[5][10], if element S[2][15] is stored at the location 10000. **3**

<center>OR</center>

An array A[30][10] is stored in the memory with each element requiring 4 bytes of storage, if the base address of A is 5000. Find out memorylocations of A[12][8], if the content is stored along the row.

d) Write a function in C++ to perform insert operation in a static circular queue containing players information represented with the help of structure PLAYER. **4**

```
struct PLAYER
{
long pid;
char pname[20];
};
```

<center>OR</center>

Write the definition for member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is included in the program.

```
struct BOOKS
{
char Isbn[20],Title[30];
BOOKS *Link;
};
class STACK
{
BOOKS *Top;
public:
    STACK()
    {
        Top=NULL;
    }
    void PUSH();
    void POP();
}
```

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

`(A/B)+C*(D-E)`

<center>OR</center>

Evaluate the following Postfix expression : `100, 45, 20+25, 15, -, +, *`

4.a) Write a function in C++ to read the content of a text file "DELHI.TXT" and display all those lines on screen which are either starting with 'D' or starting with 'M'. **2**

<center>OR</center>

<center>5 - XII C++</center>

Write a function in C++ to count the number of words whose first character is in upper case.

b) Write a function in C++ to search and display details, whose destination is "Trivandrum" from binary file "Train.Dat". Assuming the binary file is containing the objects of the following class. **3**

```
class Train
{
        int Tno; // Train Number
        char From[20]; // Train Starting Point
        char To[20]; // Train Destination
        public:
        char * StartFrom ( ); { return From; }
        char * EndTo( ); { return To; }
        void input() { cin>>Tno>>; gets(From); get(To); }
        void show( ) { cout<<Tno<< ":"<<From << ":" <<To<<endl; }
};
```

<div align="center">OR</div>

Write a function in C++ to read the objects of TOYS from binary file TOYS.DAT and display details of those TOYS which are meant for children in the age of 5 to 10 years.

```
class  TOYS
{
        int Toycode;
        char Toyname[10];
        int age;
public:
void Enter( )
{
        cin>>Toycode;
        gets(Toyname);
        cin>>age;
}
void Display( )
{
        cout<<Toycode<<":"<<Toyname<<endl;
}
int Age( )
{
        return age;
}
};
```

c) Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 1000 products. **1**

```
class PRODUCT
{
        int PCode;char PName[20];
        public:
        void Entry();void Disp();
};
void main()
{
        fstream In;
        In.open("PRODUCT.DAT",ios::binary|ios::in);
        PRODUCT P;
        In.seekg(0,ios::end);
        cout<<"Total Count: "<<In.tellg()/sizeof(P)<<endl;
        In.seekg(70*sizeof(P));
        In.read((char*)&P, sizeof(P));
        In.read((char*)&P, sizeof(P));
```

```
    cout<<"At Product:"<<In.tellg()/sizeof(P) + 1;
    In.close();
}
```
<div align="center">OR</div>

Which file stream is required for seekp()?

5.a)   Observe the following table and answer the parts (i) and (ii).   **2**

<div align="center">Table : Store</div>

Item_Code	Item	Qty	Rate
10	Gel Pen Classic	1150	25
11	Sharpener	1500	10
12	Ball Pen 0.5	1600	12
13	Eraser	1600	5
15	Ball Pen 0.25	800	20

(i) In the above table, can we have Qty as primary key. Justify your answer.

(ii) What is the cardinality and degree of the above table?

b)   Write SQL commands for the queries (i) to (iv) and output for (v) and (viii) based on a table
COMPANY and CUSTOMER   **6**

<div align="center">Table : COMPANY</div>

CID	NAME	CITY	PRODUCTNAME
111	SONY	DELHI	TV
222	NOKIA	MUMBAI	MOBILE
333	ONIDA	DELHI	TV
444	SONY	MUMBAI	MOBILE
555	BLACKBERRY	MADRAS	MOBILE
666	DELL	DELHI	LAPTOP

<div align="center">Table : CUSTOMER</div>

CUSTID	NAME	PRICE	QTY	CID
101	Rohan Sharma	70000	20	222
102	Deepak Kumar	50000	10	666
103	Mohan Kumar	30000	5	111
104	Sahil Bansal	35000	3	333
105	Neha Soni	25000	7	444
106	Sonal Aggarwal	20000	5	333
107	Arjun Singh	50000	15	666

(i) To display those company name which are having prize less than 30000.

(ii) To display the name of the companies in reverse alphabetical order.

(iii) To increase the prize by 1000 for those customer whose name starts with 'S'.

(iv) To add one more column totalprice with decimal(10,2) to the table customer.

(v) SELECT COUNT(*), CITY FROM COMPANY GROUP BY CITY;

(vi) SELECT MIN(PRICE), MAX(PRICE) FROM CUSTOMER WHERE QTY>10;

(vii) SELECT AVG (QTY) FROM CUSTOMER WHERE NAME LIKE '%r%';

(viii) SELECT PRODUCTNAME, CITY, PRICE FROMCOMPANY, CUSTOMER WHERE
COMPANY.CID=CUSTOMER.CID AND PRODUCTNAME="MOBILE";

<div align="center">7 - XII C++</div>

6.a) Name the law for the example shown below and verify it using a truth table. **2**
   X+X'.Y=X+Y

b) Write the equivalent boolean expression for the following logic circuit. **2**
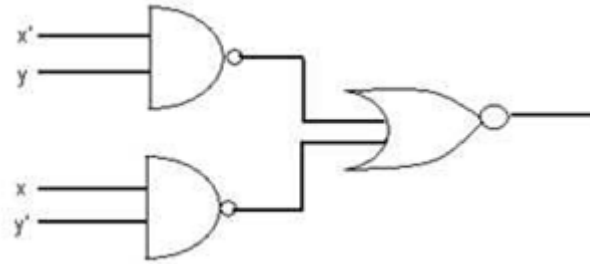
c) Write the POS form of a Boolean function F, which represented in a truth table as follows. **1**

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

d) Obtain a simplified form for the following Boolean Expression using Karnaugh's Map. **3**
   $F(A, B, C, D) = \Sigma (0, 1, 2, 4, 5, 7, 8, 9, 10, 11, 14)$

7.a) Sanju opened his e-mail and found that his inbox was full of hundreds of unwanted mails. It took him around two hours to delete these unwanted mails and find the relevant ones in his inbox. What may be the cause of his receiving so many unsolicited mails? What can Sanju do to prevent this happening in future? **2**

b) Which protocol helps us to transfer files to and from a remote computer? **1**

c) Define the following. **2**
   GSM, CDMA, WLL, SMTP

d) How does a firewall protect our Network? **1**

e) Honda has set up its branch at Srinagar for its office and web-based activities. It has 4 Zones of buildings as shown in the diagram. **4**
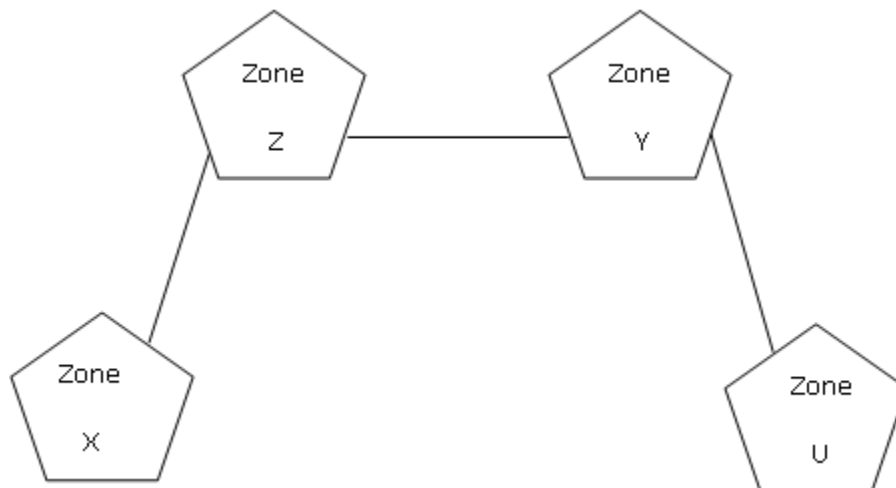
Branch - to - branch distance.

Zone X to Zone Z	40M
Zone Z to Zone Y	60M
Zone Y to Zone X	135M
Zone Y to Zone U	70M
Zone X to Zone U	165M
Zone Z to Zone U	80M

Number of Computers.

Zone X	50
Zone Z	130
Zone Y	40
Zone U	15

(i) Suggest the most suitable cable layout or networking topology of connections between the zones.

(ii) Suggest the most suitable place to house the server. Justify your answer.

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

      (a) Repeater   (b) Hub / Switch

(iv) Which is the most economic type of cable for the selected topology?