2nd PRE BOARD 2019-20
COMPUTER SCIENCE- OLD (283)
Time: 3 Hours **Max. Marks: 70**

SECTION- A

1.a) Write the type of C++ Operators for the following operators: **2**

(i) /= (ii)!= (iii) ! (iv)? :

A)(i)Assignment (ii) Relational (iii)Logical (iv) Conditional

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

```
void main( )
{  char CH, Text[ ]="computer";
   for (int i=0; Text[ i ] != '\0'; i ++)
     if (Text [ i ] != ' ')
          cout<<endl;
     else
     {    CH= toupper(Text [ i ]);
          cout<<CH;
     }
}
```

A) iostream.h - cout ctype.h- toupper

c)Rewrite the following C++ code after removing all the syntax error(s), if present in the code. Make sure that you underline each correction done by you in that code. **2**

Note: Assume that all required header files are already included, which are essential to run this code.

```
typedef  char [30]  name;
void main()
{   Country name;
    gets ( Country ) ;
    cout <<Country [ 0 ] << '\t <<Country [ 1 ] ;
    cout << Country << end ;
}
```

A)

```
typedef   char   name [ 30 ];          //error 1
void main()
{    name  Country  ;                  //error 2
     gets ( Country ) ;
     cout <<Country [0] << '\t ' <<Country [1] ;        //error 3
     cout << Country << endl ;         //error 4
}
```

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

```
#include < iostream.h>
#include < ctype.h >
void main()
{  char mystring [ ] = " New#START " ;
   for ( int i=0; mystring ( i ) != '\0' ; i++)
   {  if ( ! isalpha ( mystring [ i ] ) )
            mystring [ i ] = ' @ ' ;
      elseif ( isupper ( mystring [ i ] )  )
            mystring [ i ] + = 1 ;
      else
            mystring [ i ] = mystring [ i + 1] ;
   }
   cout  << mystring ;
}
```

A) **Ow#@TUBSU**

e)Find the output of the following code. **2**

```
#include < iostream.h >
void main()
{ int num1 = 10, num2 = 10;
  for (    int I =1; I <= 2;  I ++ )
  { cout << " Line 1 = " << num1++ << "&" << num2 – 2 << endl ;
    cout << " Line 2 = " << ++num2 << "&" << num1 + 3 << endl ;
  }
}
```

Ans: Line 1 = 10 & 8
Line 2 = 11 & 14
Line 1 = 11 & 9
Line 2 = 12 & 15

f) Observe the following code and find out, which output(s) out of (i) to (iv) will be expected from the program? Also, write the maximum values that can be assigned to the variable ***pick.*** **2**

```
void main ()
{  randomize();
   int pick;
   pick = random(3);
   char city[ ] [20] = {"Delhi","Mumbai","Chennai","Kolkata"} ;
   for (int i=0 ; i<= pick ; i++)
   {   for (int j=0 ; j<= i ; j++)
          cout << city [ j ] ;
       cout << endl ;
   }
}
```

i)Delhi
DelhiMumbai
DelhiMumbaiChennai

ii) Delhi
DelhiMumbai
DelhiMumbaiChennai
DelhiMumbaiChennaiKolkata

iii) Mumbai
MumbaiChennai
MumbaiChennaiKolkata

iv) Chennai
ChennaiKolkata
ChennaiKolkata

A) (i) & pick's min value= 0, max value= 2

Pick	i	j	Possible O/P
0	0	0	Delhi
1	0	0	Delhi
	1	0 next 1	DelhiMumbai
2	0	0	Delhi
	1	0 next 1	DelhiMumbai
	2	0 next 1, next 2	DelhiMumbaiChennai

2.a) Explain Parameterized constructor with suitable example/ syntax. **2**

A) Parameterized Constructor:

A constructor that take arguments, is called as parameterized constructor.

The parameterized constructor allow us to initialize the various data elements of different objects with different values when they are created. This is achieved by passing different values as arguments to the constructor function when the objects are created.

Eg:

```
class Rectangle
{     float  l,b,a;
public:
      Rectangle ( float len , float bre )
         //Parameterized Constructor.
      {     l = len;
            b = bre;
      }
      -----
};
void main( )
{   Rectangle  first(7.0,9.5);
     ----
     ----
 }
```

With a parameterized constructor, the initial values must be passed at the time of object created. This can be done in two manners:

(i)By calling the constructor implicitly (implicit call)
Eg: Rectangle first(8.5,3.9);

(ii)By calling the construct or explicitly (Explicit call)
Eg: Rectangle first = Rectangle (8.5,3.9);

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

```
class interview
{   int month ;
public:
    interview( int y)                    // constructor 1
    {   month = y;
    }
   interview(interview & t) ;            // constructor 2
}
```

i)Create an object, such that it invokes constructor 1.

A) interview obj (9)

ii)Write the complete definition for constructor 2.

```
A)        interview ( interview & t)
          {   month = t. month;
          }
```

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

Private members:

Cname	of character type array
Cnumber	of type long
Kms	of type float
Bill	of type float
Bill_amount	this member function should calculate the bill as **Kms *charge .**

Bill can be calculated according to the following conditions:

charge	
first 10 kms	@15 Rs / km
next 10 to 50 kms	@13 Rs / km
51 kms onwards	@ 11 rs / km

Public members:

*A function data ( ) which allows to enter Cname, Cnumber ,Kms & invoke function Bill_amount ().

*A function bill_show ( ) to display the bill amount.

A)

```
class car_bill
{   char Cname[20];
    long Cnumber;
    float Kms,Bill;
    void Bill_amount()
    {  if(Kms<=10)
            Bill=Kms*15;
       else if (Kms<=50)
            Bill=10*15+(Kms-10)*13;
       else
            Bill=10*15+40*13+(Kms-50)*11;
     }
public:
     void data()
   {     cout<<"Enter Customer Name, Customer Number, Kilometers: ";
       gets(Cname);
       cin>>Cnumber>>Kms;
       Bill_amount();
    }
   void bill_show()
   {  cout<<"\nCustomer Name: "<<Cname;
      cout<<"\nCustomer Number: "<<Cnumber;
      cout<<"\nKilometers : "<<Kms;
      cout<<"\nBill Amount: "<<Bill;
   }
};
```

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

```
class A
{   void anyval ( );
protected:
    int x, y;
    void procval ( );
public:
    void getval ( );
    void putval ( );
};
class B : protected A
{   int a, b;
protected:
   int c, d;
   void gatvalB (  ) ;
public:
  void putvalB ( ) ;
};
class C : private B
{  int p;
protected:
   int q;
  void getval ( );
public:
  void showval ( ) ;
};
```

(i)Name all the member functions which are accessible by the objects of class C.

A) showval ( )

(ii)Name all the protected members of class B.

A) **Member Variables :** x, y, c, d,

Member Functions: procval ( ), getval ( ), putval ( ), getvalB ( )

(iii)Name the base class and derives class of class B.

A) Base class: A Derived class : C

(iv)Name the data member(s) which can be accessed by the member function of class C.

A) p, q, c, d, x, y

3.a) Write the user defined function **sum_digo** to calculate and display the sum of diagonal elements of two dimensional array. **2**

A)

```
void sum_digo(int A[][4], int n)
{ int sumLt=0,sumRt=0;
  for(int i=0;i<n;i++)
  { sumLt+=A[i][i];
    sumRt+=A[n-1-i][i];
  }
cout<<"sum of left diagonal"<<sumlt<<endl;
cout<<"sum of right diagonal"<<sumRt<<endl;
}
```

(OR)

```
void sum_digo(int A[ ] [100] , int N)
{  int SUMR =0, SUML=0;
 for (int i = 0; i<N; i++)
 {  for (int j = 0; j<N; j++)
    {  if (i==j)
          SUMR=SUMR + A[i] [j] ;
       else if (i+j == N-1)
          SUML = SUML + A[i] [j];
    }
 }
cout<< "Sum of Diagonal Elements ="
          << SUMR + SUML - A[N/2] [N/2];
}
```

b)Write a function **bubble** to accept an array elements and size and perform the bubble sort on the array elements. **3**

A)

```
void bubble (int B[ ], int size)
{  int Temp;
  for (int I = 0; I<N-l; I++)
   for (int J = 0; J<N-I-l; J++)
    if(E[J] > E[J+l])
    { Temp   =  E[J];
       E[J]   =  E[J+l];
       E[J+l] = Temp;
    }
}
```

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

A) Solution:

Given Data: A[35][15] W=4 B=? R=35 C=15

$L_r = 0$ $L_c = 0$

Address of Arr[20][5] = ?

Address of Arr[2][2] = 3000.

Address of an element (I,J) in row major

$$= B+W(C(I-L_r)+(J-L_c))$$

Therefore,

3000 = B+ 4 (15(2-0)+(2-0))

3000 = B+4(30+2)

3000 = B+128

B =3000-128 =2872

Address of A[20][5]

=2872+4(15(20-0)+(5-0))

=2872+4(300+5)

=2872+1220 =4092.

d)Write a function in C++ to delete a node containing Students information, from a dyna-mically allocated stack of students implemented with the help of the following structure. **4**

```
struct student
{  int roll_no;
   char name[30];
   student * next;
};
```

A)

```
class Stack
{           student *Top ;
public :
           Stack( )
            {Top = NULL ;
             }
           void Push( ) ;
            void Pop( ) ;
           ~Stack( ) ;
} ;
void Stack::Pop( )
{  student *Temp;
  if( Top= = NULL)
     cout<<"Stack Underflow…";
  else
  {cout<<"\nThe Student roll number and name to
        delete: "<<Top→roll_no<<Top→name;
   Temp=Top;
   Top=Top→next;
   delete Temp;
  }
}
```

e) Evaluate the following Postfix expression: **2**

10, 40, +, 8, 2, +, *, 10, -

A) 10, 40, +, 8, 2, +, *, 10, -

Element Scanned	Stack Status
10	10
40	10,40
+	50
8	50,8
2	50,8,2
+	50,10
*	500
10	500,10
-	**490**

4.a) Write a function in C++ to count the number of ' I ' present in a text file " pledge.txt " and display the number of count . **2**

e.g. "India is my country. All Indians are my brothers and sisters." **Output- 6**

A)

```
void  CountI()
{  ifstream fin ("pledge.txt");
   char ch;
   int count =0;
   while (!fin.eof())
   {   fin.get(ch);
       if( ch = ='i'|| ch = = 'I')
            count ++;
    }
    cout<<count;
    fin.close();
 }
```

b)Write a function definition in C++ to add more new objects at the beginning of a binary file "student.dat", assuming the binary file is containing the objects of the following class: **3**

```
class student
{   int roll_no;
    char name[20];
public:
    void enter( )
    {cin >>roll_no;  gets( name)}
    void show( )
    { cout << roll_no << name ;}
};
```

A)

```
void AddObjects( )
{   ifstream fin("student.dat",ios::binary);
    ofstream fout("second.dat",ios::binary);
    student s;
    char ch='Y';
    do
    {   s.enter( );
        fout.write((char *)&s,sizeof(s));
        cout<<"Do you want to store more records ?(y/n): ";
        cin>>ch;
    } while(ch= ='y'||ch= ='Y');
    while(fin.read((char *)&s,sizeof(s))
       fout.write((char *)&s,sizeof(s));
    remove("student.dat");
    rename("second.dat","student.dat");
    fin.close( );
    fout.close( );
}
```

c)Read the code given below and answer the question: **1**

```
int main( )
{   char ch = 'A';
    fstream outfile ( " data.dat", ios :: out )  ;
    outfile << ch << ch;
    return 0;
}
```

If the file contains GOOD before execution what will be the contents of the file after execution of this code?

A) AA

SECTION- B

5.a) Observe the following table and answer the parts (i) & (ii) accordingly. **Table: Product** **2**

CID	CNAME	AMOUNT	COUNTRY	ITEM
115	ARJUN	10000	INDIA	BAG
116	SMITH	50000	USA	SHOES
104	CHRIS	15000	AUSTRALIA	KINDLE

i)Write names of most appropriate columns, which can be considered as candidate keys.

A) **Candidate Keys**: CID

ii)What is degree and cardinality of the above table.

A) **Degree**: 5 **Cardinality**: 3

b)Write SQL commands for (i) to (iv) and write outputs for (v) to (viii) on the basis of table STUDENT. **6**

TABLE: STUDENT

SL	NAME	STREAM	FEES	AGE	SEX
1	AJAI RAI	MATHS	750	17	M
2	DIVYA	COMPUTER	750	18	F
3	KESHAV	BIOLOGY	500	16	M
4	DIPENDRA	ENG. LIT	350	18	F
5	BABITA	ECONOMICS	300	19	F
6	MADHURA	COMPUTER	750	15	F
7	MOMIN	ECONOMICS	300	16	M
8	NEHA	BIOLOGY	500	15	F

(i)List the name of all the students, who have taken stream as COMPUTER.

A) SELECT NAME FROM STUDENT WHERE STREAM= 'COMPUTER';

(ii)To count the number of female students.

A) SELECT COUNT (*) FROM STUDENT WHERE SEX= 'F';

(iii)To display the number of students stream wise.

A) SELECT STREAM, COUNT(*) FROM STUDENT GROUP BY STREAM;

(iv)To insert a new row in the STUDENTS table –

9, 'KRISHNA', 'HISTORY', 300, 19, 'F'

A) INSERT INTO STUDENT VALUES

(9, 'KRISHNA', 'HISTORY', 300, 19, 'F');

(v)SELECT AVG(FEES) FROM STUDENT WHERE STREAM= 'COMPUTER';

A) AVG(FEES)

750

(vi)SELECT MAX(AGE) FROM STUDENT;

A) MAX(AGE)

19

(vii)SELECT COUNT(DISTINCT STREAM) FROM STUDENT;

A) COUNT(DISTINCT STREAM)

5

(viii)SELECT SUM(FEES) FROM STUDENT GROUP BY STREAM;

A)

SUM(FEES)
750
1500
1000
350
600

6.a) State any one of the Distributive law of Boolean algebra and verify using truth table. **2**

Ans: (i) A.(B+C)=A.B+A.C

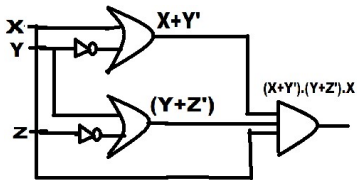
(ii) A + B.C= (A+B).(A+C)

A	B	C	B+C	A(B+C)	AB	AC	AB+AC
0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	0	0	0	0
1	0	0	0	0	0	0	0
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

b)Draw the logical circuit diagram for the following Boolean expression. **2**

((X + Y') . (Y + Z') . X)

A)



c)Given the following truth table, derive Product of Sum (POS) form of the Boolean expression from it. **1**

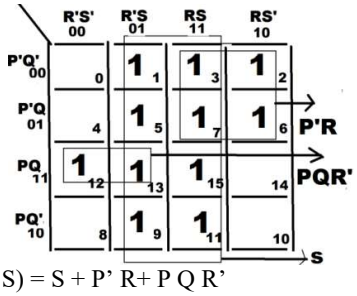
A	B	C	F(A,B,C)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

A) POS=(A+B'+C).(A'+B+C).(A'+B'+C') **OR** = π(2,4,7)

d)Reduce the following Boolean Expression to its simplest form using K-Map. **3**

F(P, Q, R, S) = $\sum$(1, 2, 3, 5, 6, 7, 9, 11, 12, 13, 15)

A)



F(P, Q, R, S) = S + P' R+ P Q R'

7.a) What is Firewall? **1**

Ans: Security system to prevent unauthorized access

(A **firewall** is a part of a computer system or network that is designed to block unauthorized access while permitting authorized communications. It is a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria.)

b)Which out of the following does not come under cyber crime? **1**

i)Stealing a mouse from someone's computer.

ii)Operating someone's internet banking without his/her knowledge.

iii)Entering someone's computer remotely and copying data, without permission.

Ans: i)

c) Expand the following **2**

(i) GPRS (ii) GSM (iii) CDMA (iv) VoIP

Ans: i) GPRS- General packet Radio Services

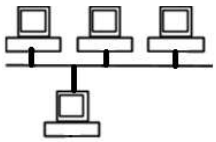
ii)GSM- Global System for Mobile Communication

iii) CDMA- Code Division Multiple Access

iv) VoIP- Voice Over Internet Protocol

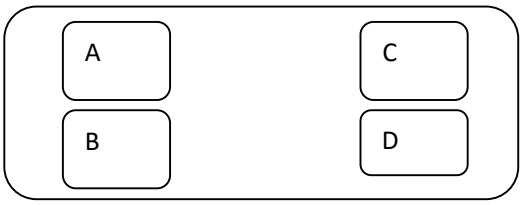
d)Write an advantage of having a Bus topology of network; also illustrate how four computers can be connected using Bus topology. **2**

A) Cable length required for this topology is the least compared to other networks.



Bus Topology

e)Knowledge Supply Organization has set up its new centre at Pune for its office and web based activities. It has 4 blocks of building A, B, C& D. 4



Shortest distance between various blocks:

Centre A to Centre B	50m
Centre B to Centre C	70m
Centre C to Centre A	125m
Centre A to Centre D	175m
Centre B to Centre D	90m
Centre C to Centre D	80m

Number of computers installed at various buildings are as follows:

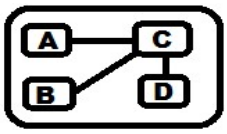
Centre A	50
Centre B	30
Centre C	150
Centre D	15

(i)Suggest the most appropriate location of the server inside Pune centre to get the best connectivity for maximum number of computers. Justify your answer.

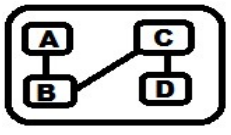
A) C- block (maximum no of computers)

(ii)Suggest and draw the cable layout to efficiently connect various building within the Pune for connecting computers.

Best Layout 1 (Server to all other locations)



Best Layout 2 (Less Cable Length)



(iii)Which of the following will you suggest to establish connection between the computers in each block of Pune centre.

i) Repeater ii) Hub iii) Router iv) Switch

A) Switch

(iv)Which hardware device will you suggest to procure by the company to be installed to protect and control the Internet within the Centre.

A) Firewall.

***If Wealth is lost, Nothing is lost,
If Health is lost, Something is lost,
If Character is lost, Everything is lost ***