Series BVM/C

Roll No. ☐☐☐☐☐☐☐

Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **28** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

COMPUTER SCIENCE

Time allowed : 3 hours   *Maximum Marks : 70*

General Instructions :

(i)   SECTION A refers to programming language C++.

(ii)   SECTION B refers to programming language Python.

(iii)   SECTION C is compulsory for all.

(iv)   Answer either SECTION A or SECTION B.

(v)   It is compulsory to mention on the page 1 in the answer-book whether you are attempting SECTION A or SECTION B.

*(vi)   **All** questions are compulsory within each section.*

(vii)   Questions 2(b), 2(d), 3 and 4 have internal choices.

SECTION A
[Only for candidates, who opted for C++]

1. (a) Which of the following are valid operators in C++ :
    (i)   + =
    (ii)   not
    (iii) = /
    (iv) &&
    (v)   ≥
    (vi) = =
    (vii) ++
    (viii) and   *2*

(b) Write the names of the correct header files, which must be included to compile the code successfully :   *1*

```
void main()
{
    char S1[20]="CS", S2[20]="2018";
    strcat(S1,S2);
    cout<< S1;
}
```

(c) Rewrite the following **C++ program** after removing any/all syntactical error(s). Underline each correction done in the code :   *2*
Note : Assume all required header files are already included in the program.

```
#define Volume(L,B,H) = L*B*H
structure Cube
{
    int Length,Breadth,Height;
};
void main()
{
    Cube C = [10,15,20];
    cout<<Volume(Length,Breadth,Height);
}
```

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

```
void Convert(char *P1, char *P2)
{
    char *Q;
    Q=P2;
    P2=P1;
    P1=Q;
    cout<<P1<<"*"<<P2<<endl;
}
void main()
{
    char S1[]="One", S2[]="Two";
    Convert(S1,S2);
    cout<<S1<<"&"<<S2<<endl;
}
```

(e) 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 Alter(float &I, int J=2)
{
    I=I+J;
    J=I/J;
    cout<<I<<"#"<<J<<endl;
}
void main()
{
    float P=25, Q=15;
    Alter(P,Q);
    Alter(P);
    Alter(Q);
}
```

(f) Observe the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the minimum and maximum values that can possibly be assigned to the variable End.   *2*
Note :
- Assume all the required header files are already being included in the code.
- The function random(N) generates any possible integer between 0 and N-1 (both values included).

```cpp
void main()
{
  randomize();
  int A[]={5,10,15,20,25,30,35,40};
  int Start = random(2) + 1;
  int End = Start + random(4);
  for(int I=Start; I<=End, I++)
    cout<<A[I]<<"*";
}
```

(i) 20*25*30*35*	(ii) 15*20*25*30*
(iii) 5*15*20	(iv) 10*15*20*25*30*

2. (a) Given the following class Exam and assuming all necessary header file(s) included, answer the questions that follow the code :

```
class Exam
{
    int Marks; char EName[20];
public:
    Exam (int M)                    //Function 1
    {
        Marks = M;
    }
    Exam (char S[])                 //Function 2
    {
        strcpy(EName,S);
    }
    Exam (char S[], int M)          //Function 3
    {
        Marks = M;
        strcpy(EName,S);
    }
    Exam (Exam &E)                  //Function 4
    {
        Marks = E.Marks + 10;
        strcpy(EName,E.EName);
    }
};


void main()
{
    Exam E1(10);                        //Statement I
    Exam E2(70);                        //Statement II
    Exam E4("THEORY",70);               //Statement III
    _____;                    //Statement IV
}
```

(i) Which of the statement(s) out of (I), (II), (III), (IV) is/are *incorrect* for object(s) of the class Exam ? *1*

(ii) What is Function 4 known as ? Write the **Statement IV**, that would execute **Function 4**. *1*

(b) Observe the following C++ code and answer the questions (i) and (ii).

Note : Assume all necessary files are included.

```cpp
class Coordinate
{
    int X,Y;
public:
    Coordinate(int I=20, int J=10)      //Function 1
    {
        X = J; Y = I;
    }
    void Show()                         //Function 2
    {
        cout<<"Coordinates are "<<X<<" & "<<Y<<endl;
    }
    ~Coordinate()                       //Function 3
    {
        cout<<"Erased "<<endl;
    }
};

void main()
{
    Coordinate C(15);
    C.Show();
}
```

(i) For the class Coordinate, what is **Function 3** known as ?
When is it executed ?   *1*

(ii) What is the output of the above code, on execution ?   *1*

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

(b) Explain Constructor Overloading in context of Object Oriented
Programming. Also give a supporting example in C++.   *2*

(c) Write the definition of a class STATS in C++ with following description : *4*

Private Members

- **Code**   // integer

- **Tests**   // an array of integer with 3 elements

- **Avg**   // integer

- **CalAvg()**   /* Member function to calculate Avg
                    as Average of values given in
                    array Tests */

Public Members

- **In()**   /* Function to allow user to enter values
              of Code and Tests and then invoke
              CalAvg() to calculate average */

- **Out()**   // Function to display all data members

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

```
class GFloor
{
    int GRooms;
protected:
    void Give();
public:
    void Take();
};

class FFloor : private GFloor
{
    int FRooms;
public:
    void Get(); void Put();
};

class SFloor : public FFloor
{
    int SRooms;
public:
    void Input(); void Output();
};

void main()
{
    SFloor S;
}
```

(i) Which type of Inheritance out of the following is illustrated in the above example ?

– Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance

(ii) Write the names of **all the members**, which are directly accessible by the member function **Get()** of class **FFloor**.

(iii) Write the names of **all the members**, which are directly accessible by the member function **Input()** of class **SFloor**.

(iv) Write the names of **all the members**, which are directly accessible by the object **S** of class **SFloor** declared in the **main()** function.

OR

(d) Consider the following class Institution   *4*

```
class Institution
{
    int Code;
    char Course[20];
protected :
    float Fee;

public:
    void Reg(){cin>>Code;gets(Course);cin>>Fee;}
    void Show(){cout<<Code<<Course<<Fee<<endl;}
};
```

Write a code in C++ to publicly derive another class Student from the base class Institution with following members.

Data Members
    Rno of type long
    Name of type character of size 10

Member Functions
    A constructor function to assign Rno as 100
    Admit() to allow user to enter Rno and Name
    Display() to display Rno and Name

3. (a) Write a user-defined function **NoThreeFive(int Arr[], int N)** in C++, which should display the value of all such elements and their corresponding locations in the array **Arr** (i.e. the array index), which are **not multiples of 3 or 5. N** represents the total number of elements in the array **Arr**, to be checked.   *3*

Example : If the array Arr contains

0	1	2	3	4
25	8	15	49	9

Then the function should display the output as

    8 at location 1

    49 at location 3

OR

(a) Write a user-defined function **HalfReverse(int Arr[], int N)** in C++, which should first reverse the contents of the first half of the array **Arr** and then reverse the contents of the second half of the array **Arr**. The total number of elements in the array **Arr** is represented by **N** (which is an even integer). *3*

Example : If the array **Arr** contains the following elements (for **N = 6**)

0	1	2	3	4	5
12	5	7	23	8	10

Then the function should rearrange the array to become

0	1	2	3	4	5
7	5	12	10	8	23

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.
- Do not use any other array to transfer the contents of array Arr.

(b) Write a user-defined function **OneZero(int M[4] [4])** in C++, which replaces every occurrence of a **1** with a **0** in the array, and vice versa. *2*

For example :

ORIGINAL ARRAY M				CHANGED ARRAY M			
1	1	0	1	0	0	1	0
0	1	0	0	1	0	1	1
0	0	1	1	1	1	0	0
1	1	0	0	0	0	1	1

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.
- Do not use any other array to transfer the contents of array M.

OR

(b) Write a user-defined function **RowSwap(int A [4] [4])** in C++, which swaps the contents of the first row with the contents of the third row.   *2*

For example :

ORIGINAL ARRAY A			
10	15	20	25
30	35	40	45
50	55	60	65
70	75	80	85

CHANGED ARRAY A			
50	55	60	65
30	35	40	45
10	15	20	25
70	75	80	85

NOTE :

- **DO NOT DISPLAY** the Changed Array contents.

- Do not use any other array to transfer the contents of array A.

(c) Let us assume P[20][30] is a two-dimensional array, which is stored in the memory along the column with each of its elements occupying 2 bytes, find the address of the element P[3][5], if the address of the array is 45000.   *3*

OR

(c) Let us assume P[10][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 2 bytes, find the address of the element P[5][10], if the address of the element P[2][15] is 25000.   *3*

(d) For the following structure of Items in C++

```
struct Item
{
    char Name[20];
    float Price;
    Item *Link;
};
```

Given that the following declaration of class ItemStack in C++ represents a dynamic stack of Items :

```
class ItemStack
{
    Item *Top; //Pointer with address of Topmost Item
    of Stack
public:
    ItemStack()
    {
       Top = NULL;
    }
    void Push(); //Function to push an Item into the
                     dynamic stack
    void Pop();  //Function to pop an Item from the
                     dynamic stack
    ~ItemStack();
};
```

Write the definition for the member function void ItemStack::Pop(), that pops the details of an Item from the dynamic stack of ItemStack. *4*

OR

(d) Write a user-defined function **Push(Item S[], int &T),** which pushes the details of an Item, into the static stack of Items S, at the location T (representing the Top end of the stack), where every Item to be pushed into the stack is represented by the following structure : *4*

```
struct Item
{
    char Name[20];
    float Price;
};
```

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(e) 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
```

OR

(e) Evaluate the following Postfix expression, showing the stack contents : *2*

```
150,25,5,/,45,+,2,*,-
```

4. (a) A text file named **IONS.TXT** contains some text. Write a user-defined function ShowP() in C++ which displays all such words of the file which start with alphabet 'P'. *3*

For example : If the file **IONS.TXT** contains :

"Whether an atom will form a cation or an anion is based on its position in the periodic table"

Then the function ShowP() should display the output as

```
position, periodic
```

OR

(a) A text file named **BIG.TXT** contains some text. Another text file named **SMALL.TXT** needs to be created such that it would store **only the first 50 characters** from the file **BIG.TXT**.

Write a user-defined function **BigToSmall()** in C++ that would perform the above task of creating **SMALL.TXT** from the already existing file **BIG.TXT**. *3*

(b) A binary file CUSTOMER.DAT contains records stored as objects of the following class :

```
class Customer
{
    int CNo; char Name[20]; char Address[30];
public:
    int *GetNo() { return CNo; }
    void Show()
    { cout<<CNo<<" * " <<Name<< " * " <<Address<<endl;
};
```

Write a user-defined function **Search(int N)** in C++, which displays the details of the Customer from the file CUSTOMER.DAT, whose CNo matches with the parameter N passed to the function. *2*

OR

(b) Write a user-defined function TotalCost() in C++ to read each object of a binary file ITEMS.DAT, and display the Name from all such records, whose Cost is above 150. Assume that the file ITEMS.DAT is created with the help of objects of class Item, which is defined below : *2*

```cpp
class Item
{
    char Name[20]; float Cost;
public:
    char* RName() { return Name; }
    float RCost() { return Cost; }

};
```

(c) Find the output of the following C++ code considering that the binary file ITEMS.DAT exists on the hard disk with the following 5 records for the class Item containing Name and Cost. *1*

Name	Cost
Rice	110
Wheat	60
Cheese	200
Pulses	170
Sauce	150

```cpp
void main()
{
    fstream File;
    File.open("ITEMS.DAT",ios::binary|ios::in);
    Item T;
    for (int I=1; I<=2; I++)
    {
        File.seekg((2*I-1)*sizeof(T));
        File.read((char*)&T, sizeof(T));
        cout<<"Read :"<<File.tellg()/sizeof(T)<<endl;
    }
    File.close();
}
```

OR

(c) Differentiate between ios::out and ios::app file modes. *1*

1. (a) Which of the following are valid operators in Python ? *2*
    - (i) +=
    - (ii) ^
    - (iii) in
    - (iv) &&
    - (v) between
    - (vi) */
    - (vii) is
    - (viii) like

    (b) Name the Python Library modules which need to be imported to invoke the following functions : *1*
    - (i) **open()**
    - (ii) **factorial()**

    (c) Rewrite the following code in Python after removing all syntax error(s). Underline each correction done in the code. *2*

```
"HELLO"=String
for I in range(0,len(String)-1)
    if String[I]=>"M":
        print String[I],"*"
    Else:
        print String[I-1]
```

    (d) Find and write the output of the following Python code : *2*

```
Str1="EXAM2018"
Str2=""
I=0
while I<len(Str1):
    if Str1[I]>="A" and Str1[I]<="M":
        Str2=Str2+Str1[I+1]
    elif Str1[I]>="0" and Str1[I]<="9":
        Str2=Str2+ (Str1[I-1])
    else:
        Str2=Str2+"*"
        I=I+1
print Str2
```

(e)   Find and write the output of the following Python code :   *3*

```
def Alter(P=15,Q=10):
    P=P*Q
    Q=P/Q
    print P,"#",Q
    return Q
A=100
B=200
A=Alter(A,B)
print A,"$",B
B=Alter(B)
print A,"$",B
A=Alter(A)
print A,"$",B
```

(f)   What possible output(s) are expected to be displayed on screen at the time of execution of the program from the following Python code ? Also specify the minimum values that can be assigned to each of the variables BEGIN and LAST.   *2*

```
import random

VAL=[80,70,60,50,40,30,20,10]
Start=random.randint(1,3)
End=random.randint(Start,4)

for I in range(Start,End+1):
    print VAL[I],"*",
```

(i) 40 * 30 * 20 * 10 *	(ii) 70 * 60 * 50 * 40 * 30 *
(iii) 50 * 40 * 30 *	(iv) 60 * 50 * 40 * 30 *

2. (a) What is an Abstract Method in a class of Python ? Write a code in Python to illustrate use of an Abstract Method in Python. *2*

(b)
```python
class Matter:
    Vol = 10
    Type="SOLID"
    def __init__(self,T,V=30):
        self.Type = T
        self.Vol = V
    def Disp(self):
        print self.Type,Matter.Type
        print self.Vol,Matter.Vol
M1=Matter("GAS",20)
M1.Disp()
Matter.Type="LIQUID"
M2=Matter("SOLID")
M2.Disp()
```

(b) Write the output of the above Python code. *2*

OR

```python
class Point:                        #Line 1
    def __init__(self):             #Line 2
        self.X = 20                 #Line 3
        self.Y = 24                 #Line 4
    def Show(self):                 #Line 5
        print self.X,self.Y         #Line 6
    def __del__(self):              #Line 7
        print "Point Moved"         #Line 8
def Fun():                          #Line 9
    P=Point()                       #Line 10
    P.Show()                        #Line 11
Fun()                               #Line 12
```

(i)   What are the methods/functions mentioned in Line 2 and Line 7 specifically known as ?

(ii)   Mention the line number of the statement, which will call and execute the method/function shown in Line 2.   *2*

(c)   Define a class TRANSPORT in Python with the following specifications :   *4*

Instance Attributes

```
- Vno              # Vehicle Number
- Vehicle          # Vehicle Name
- Type             # Type of the Vehicle
```

Methods/Functions

```
- FindType()       # To assign Type of Vehicle
                   # based on Name of the Vehicle as shown
                   # below :
```

Vehicle	Type
MotorCycle	MCYCL
Car	MTV
Truck	HTV
Bus	HTV

```
- Enter()      # To allow user to enter value of
               # Vno and Vehicle. Also, this method should
               # call FindType() to assign Type
- Display()    # To display Vno, Vehicle and Type
```

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

```
class Super(object):                        #Line 1
    def __init__(self,n):                   #Line 2
        self.N = n
    def Set(self,n):                        #Line 3
        self.n =self.N+n
    def SPShow(self):                       #Line 4
        print self.N

class Top(object):                          #Line 5
    def __init__(self,n):                   #Line 6
        self.N=n
    def Set(self,n):                        #Line 7
        self.N =self.N+n
    def TPShow(self):                       #Line 8
        print self.N

class Bottom(Super,Top):                    #Line 9
    def __init__(self,d):                   #Line 10
        self.D=d
        n=0
        if self.D<10:
          n=5
        else:
          n=10
        Super.__init__(self,n)              #Line 11
        Top.__init__(self,n)                #Line 12
    def SetAll(self,n):                     #Line 13
        Super.Set(self,n)
        Top.Set(self,n)
    def BTShow(self):                       #Line 14
        print self.D,
        Super.SPShow(self)
        Top.TPShow(self)
    B=Bottom(101)                           #Line 15
    B.SetAll(7)
    B.BTShow()
```

(i) Write the type of the inheritance illustrated in the above. *1*

(ii) Find and write the output of the above code. *2*

(iii) What is the difference between the statements shown in Line 11 and Line 12 ? *1*

OR

(d) Define Inheritance. Show brief Python example of Single Level, Multiple and Multilevel Inheritance. *4*

3. (a) Consider the following randomly ordered numbers stored in a list :

$$601, 430, 160, 120, 215, 127$$

Show the content of list after the First, Second and Third pass of the selection sort method used for arranging in **ascending order**. *3*

Note : Show the status of all the elements after each pass very clearly encircling the changes.

OR

(a) Consider the following randomly ordered numbers stored in a list :

$$601, 430, 160, 120, 215, 127$$

Show the content of list after the First, Second and Third pass of the bubble sort method used for arranging in **descending order**. *3*

Note : Show the status of all the elements after each pass very clearly encircling the changes.

(b) Write definition of a method/function **DoubletheOdd(Nums)** to add and display twice of odd values from the list of Nums. *3*

For example :

If the Nums contains **[25,24,35,20,32,41]**

The function should display

Twice of Odd Sum: **202**

OR

(b) Write definition of a method/function **FindOut(Names, HisName)** to search for HisName string from a list Names, and display the position of its presence. *3*

For example :
If the Names contain **["Arun","Raj","Tarun","Kanika"]**
and HisName contains **"Tarun"**

The function should display
Tarun at 2

(c) Write **InsQueue(Passenger)** and **DelQueue(Passenger)** methods/function in Python to add a new Passenger and delete a Passenger from a list of Passenger names, considering them to act as insert and delete operations of the Queue data structure. *4*

OR

(c) Write **DoPush(Customer)** and **DoPop(Customer)** methods/function in Python to add a new Customer and delete a Customer from a List of Customer names, considering them to act as push and pop operations of the Stack data structure. *4*

(d) Write a Python method/function **SwitchOver(Val)** to swap the even and odd positions of the values in the list Val. *2*

Note : Assuming that the list has even number of values in it.
For example :
If the list Numbers contain
[25,17,19,13,12,15]
After swapping the list content should be displayed as
[17,25,13,19,15,12]

OR

(d) Write a Python method/function **Count(Start,End,Step)** to display natural numbers from Start. *2*

End in equal intervals of Step

For example :

If the values of Start as 14, End as 35 and Step as 6

The method should be displayed as

`14`

`20`

`26`

`32`

(e) Evaluate the following Postfix expression, showing the stack contents : *2*

   `25,5,*,15,3,/,+,10,-`

OR

(e) 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`

4. (a) Write a statement in Python to open a text file CONTENT.TXT so that new contents can be written in it. *1*

OR

(a) Write a statement in Python to open a text file REMARKS.TXT so that existing content can be read from it. *1*

(b) Write a method/function **BIGWORDS()** in Python to read contents from a text file CODE.TXT, to count and display the occurrence of those words, which are having 5 or more alphabets. *2*

For example :
If the content of the file is

```
ME AND MY FRIENDS
ENSURE SAFETY AND SECURITY OF EVERYONE
```

The method/function should display

```
Count of big words is 5
```

OR

(b) Write a method/function **BIGLINES()** in Python to read lines from a text file CONTENT.TXT, and display those lines, which are bigger than 20 characters. *2*

For example :
If the content of the file is

```
Stay positive and happy
Work hard and dont give up hope
Be open to criticism and keep learning
Surround yourself with happy, warm and genuine people
```

The method/function should display

```
Be open to criticism and keep learning
Surround yourself with happy, warm and genuine people
```

(c) Considering the following definition of class ITEMS, write a method/function **LowStock()** in Python to search and display Iname and Qty from a pickled file STOCK.DAT, for the items, whose Qty is less than 10. *3*

```
class ITEMS :

    def __init__(self,I,Q):

        self.Iname=N

        self.Qty=Q

    def IDisp(self):

        print self.Iname,"@",self.Qty
```

OR

(c) Considering the following definition of class MEMBERS, write a method/function **MONTHLYMEMBERS()** in Python to search and display all the content from a pickled file MEMBERS.DAT, where Type of MEMBERS is "MONTHLY". *3*

```
class MEMBERS :

    def __init__(self,N,T):

        self.Name=N

        self.Type=T

    def Disp(self):

        print self.Name,"$",self.Type
```

5. (a) Observe the following table STOCK carefully and answer the questions that follow : *2*

Table : STOCK

SNO	NAME	PRICE
101	PEN	50
102	PENCIL	5
103	PENCIL	10
104	NOTEBOOK	50
105	ERASER	5

Which attribute out of SNO, NAME and PRICE is the ideal one for being considered as the Primary Key and why ?

(b) Write SQL queries for (i) to (iv) and write outputs for SQL queries (v) to (viii), which are based on the tables given below : *6*

Table : TRAINS

TNO	TNAME	START	END
11096	Ahimsa Express	Pune Junction	Ahmedabad Junction
12015	Ajmer Shatabdi	New Delhi	Ajmer Junction
1651	Pune Hbj Special	Pune Junction	Habibganj
13005	Amritsar Mail	Howrah Junction	Amritsar Junction
12002	Bhopal Shatabdi	New Delhi	Habibganj
12417	Prayag Raj Express	Allahabad Junction	New Delhi
14673	Shaheed Express	Jaynagar	Amritsar Junction
12314	Sealdah Rajdhani	New Delhi	Sealdah
12498	Shan-e-Punjab	Amritsar Junction	New Delhi
12451	Shram Shakti Express	Kanpur Central	New Delhi
12030	Swarna Shatabdi	Amritsar Junction	New Delhi

Table : PASSENGERS

PNR	TNO	PNAME	GENDER	AGE	TRAVELDATE
P001	13005	R N AGRAWAL	MALE	45	2018-12-25
P002	12015	P TIWARY	MALE	28	2018-11-10
P003	12015	S TIWARY	FEMALE	22	2018-11-10
P004	12030	S K SAXENA	MALE	42	2018-10-12
P005	12030	S SAXENA	FEMALE	35	2018-10-12
P006	12030	P SAXENA	FEMALE	12	2018-10-12
P007	13005	N S SINGH	MALE	52	2018-05-09
P008	12030	J K SHARMA	MALE	65	2018-05-09
P009	12030	R SHARMA	FEMALE	58	2018-05-09

NOTE : All Dates are given in 'YYYY-MM-DD' format.

(i) To display total number of MALE and FEMALE Passengers

(ii) To display details of all Trains which Start from Pune Junction

(iii) To display details of all Passengers travelling in Trains whose TNO is 12030

(iv) To display the PNR, PNAME, GENDER and AGE of all Passengers whose AGE is above 50.

(v) `SELECT DISTINCT TRAVELDATE FROM PASSENGERS;`

(vi) `SELECT MIN (TRAVELDATE), MAX (TRAVELDATE) FROM PASSENGERS WHERE GENDER = 'MALE';`

(vii) `SELECT START, COUNT(*) FROM TRAINS`

`GROUP BY START HAVING COUNT (*)>1;`

(viii) `SELECT TNAME, PNAME FROM TRAINS T, PASSENGERS P`

`WHERE T.TNO = P.TNO AND AGE BETWEEN 40 AND 50;`

6. (a) State any one Absorption Law of Boolean Algebra and verify it using truth table. *2*

(b) Draw the Logic Circuit of the following Boolean Expression : *2*

`A'.B + A.C'`

(c)   Derive a Canonical POS expression for a Boolean function F, represented by the following truth table :   *1*

X	Y	Z	F(X,Y,Z)
0	0	0	0
0	0	1	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 to its simplest form using K-Map :   *3*

$$F(P,Q,R,S) = \Sigma(2,6,7,8,9,10,11,13,14,15)$$

7.   (a)   William Jones has got a file that is replicating itself in order to spread to other computers using computer network on its own, relying on security failures on the target computer to access it. It is consuming a lot of network bandwidth also. Which of the following type category of infection will it be considered ? Also, mention, what should he do to prevent this infection ?   *2*

(i)   Virus

(ii)   Worm

(iii)   Trojan Horse

(b)   Dr. Theekkar Singh is a very experienced orthopaedician in the Ilaj Nagar City. He is planning to connect 5 of his clinics of the city with a personalised application for his appointment organization without using mobile/web application. Which out of the following networks would be suitable ?   *1*

(i)   PAN

(ii)   LAN

(iii)   MAN

(iv)   WAN

(c) Select two server side scripting languages out of the following ? *1*

    (i)   ASP

    (ii)   VBScript

    (iii) JavaScript

    (iv) PHP

(d) Write the expanded names for the following abbreviated terms used in Networking and Communications : *2*

    (i)   HTML

    (ii)   PAN

    (iii) TCP

    (iv) GBPS

(e) CASE STUDY BASED QUESTION

Piccadily Design and Training Institute is setting up its centre in Jodhpur with four specialised units for Design, Media, HR and Training in separate buildings. The physical distances between these units and the number of computers to be installed in these units are given as follows.

You as a network expert, have to answer the queries as raised by the administrator as given in (i) to (iv).
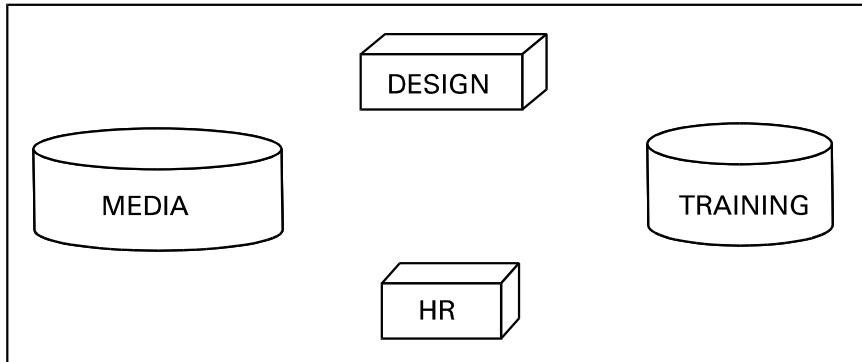
Shortest distances between various locations in metres :

Design Unit to Media Unit	60
Design Unit to HR Unit	40
Design Unit to Training Unit	60
Media Unit to Training Unit	100
Media Unit to HR Unit	50
Training Unit to HR Unit	60

Number of computers installed at various locations are as follows :

Design Unit	40
Media Unit	50
HR Unit	110
Training Unit	40

(i)   Suggest the most suitable location to install the main server of this institution to get efficient connectivity. *1*

(ii) Suggest by drawing the best cable layout for effective network connectivity of the building having server with all the other units. *1*

(iii) Suggest the devices to be installed in each of these buildings for connecting computers installed within each of the units out of the following : *1*

Modem, Switch, Gateway, Router

(iv) Suggest an efficient as well as economic wired medium to be used within each unit for connecting computer systems out of the following network cable : *1*

Co-axial Cable, Ethernet Cable, Single Pair Telephone Cable.