Instructions: (i)   All questions are compulsory.
                       (ii)   Programming language: C++

1. a) Find the output of the following program: [3]

```
#include<iostream.h>
voidChangetheContent(intArr[], int Count)
{
for(int C=0; C<Count; C++)
Arr[C]=Arr[Count – C – 1];
}
void main()
{
int A[]= {1, 2, 3}, B[] = {20, 30, 40, 50}, C[]= {100, 200};
ChangetheContent(A,3);
ChangetheContent(B,4);
ChangetheContent(C,2);
for(int L=0; L<3; L++) cout<<A[L]<<'#';
cout<<endl;
for(int L=0; L<4; L++) cout<<B[L]<<'#';
cout<<endl;
for(int L=0; L<2; L++) cout<<C[L]<<'#';
cout<<endl;
}
```

   b) Study the following program and select the possible output from it: [2]

```
#include<iostream.h>
#include<stdlib.h>
constint LIMIT = 4;
void main()
{
randomize();
int Points;
Points= 100 + random(LIMIT);
for(int P=Points; P>=100; P--)
cout<<P<<'#';
cout<<endl;
}
```

   (i) 103#102#101#100#
   (ii) 100#101#102#103#
   (iii)104#103#102#101#
   (iv)103#102#101#100

   c) Find the output of the following program   [3]

```
#include<iostream.h>
#include<ctype.h>
void main()
{
char Text[ ] = "Mind@Work!";
for(inti=0 ; Text[i]!='\0' ; i++)
{
if(!isalpha(Text[i]))
Text[i]= '*';
else if (isupper(Text[i]))
Text[ i]=Text[i]+1;
else
Text[i]=Text[i+1];
}
cout<<Text;
}
```

   d). Find the correct possible output(s)   [2]

```
#include<stdlib.h>
#include<iostream.h>
void main()
{
```

```
randomize();
char city[ ][20]={"PKD", "EKM", "TVM", "KOL", "CAL"};
int ZEN;
for(inti=0;i<3;i++);
{
ZEN=random(2)+1;
cout<<city[ZEN]<<"@";
}
}
```

(i) PKD@ EKM @TVM@

(ii) EKM @TVM@ EKM @

(iii) TVM@KOL@CAL@

(iv) TVM@ EKM @TVM@

e) When a function is overloaded, there are multiple definitions of the functions. What makes the various definitions of the function different from each other?   [1]

f) Which C++ header file(s) will be essentially required to run/execute the following C++ code?   [2]

```
void main()
{
intRno=465;
charSName1[40], SName[]= "Ajay Bhaskar";
strcpy (SName1, SName)
cout<<setw(6) <<Rno<<setw(25)<<SName<<endl;
exit(0);
}
```

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

i.
```
#include<iostream.h>                                                                 [2]
struct Screen
{ int C, R;}
voidShowPoint(Screen P)
{
cout<<P.C, P.R<<endl;
}
void main()
{
Screen Point1 = (5, 3);
ShowPoint(Point1);
Screen Point2= point1;
C.Point1+= 2;
Point1.R = Point1.R + 2;
}
```

ii.
```
#include<iostream.h>                                                                 [2]
#include<stdio.h>
void main()
{
structemp
{
charemp_name[15];
charemp_no;
int salary = 5000;
}EMPLOYEE;
gets(emp_name);
gets(emp_no);
}
```

iii.
```
class student                                                                        [3]
{
intrno=100;
char class[20];
PUBLIC; void INPUT( )
{
cin>>rno;
gets(class);
}
void OUTPUT( )
}
```

```
cout<<rno<<class;
}
};
void main( )
{
student s1;
cout<<s1.rno;
INPUT( ).s1;
}
```

2. **a)** Define a class BOOK with the following specifications.   [4]
    Private members
    BOOK_NO integer type
    BOOK_TITLE 20 Characters
    PRICE float(price per copy)
    TOTAL_COST() A function to calculate the total cost for N number of copies,
    Where N is passed to the function as argument
    Public members
    INPUT() Function to read BOO_NO, BOOK_TITLE, PRICE
    PURCHASE() Function to ask the user to input the number of copies to be
    purchased. It invokes TOTAL_COST() and prints the total
    cost to be paid by the user.
    Note: You are also required to give detailed function definitions.
  (Write the complete program)

  b) Write any two difference between the following :   [4]
    i. private and public access specifier
ii. Classes and Objects

  c) Define a class Sports in C++ with following descriptions: [4]
    Private members:
       • S_Code of type long
       • S_Name of type character array (String)
       • Fees of type integer
       • Duration of type integer
    Public members:
    • A function NewSports() which allows user to enter S_Code, S_Name and Duration. Also assign
    the values to Fees as per the following conditions:

         S_NameFees
         Table Tennis2000
         Swimming4000
         Football3000
    • A function DisplaySports() to display all the details.
    (Write the complete program)

3.**a)** Write a function **Get1from2()** function in C++ to transfer the content from two arrays First[ ] and
    Second[ ] to array All[ ]. The even places (0,2,4…..) of array All[] should get the contents from the
    array First[ ] and odd places (1,3,5….)of the array All[ ] should get the contents from the array
    Second[ ]   [3]
Eg:
    If the First [ ] array contains 30, 60,90,
    And the Second [ ] array contains10, 50,80,
    Then All [ ] array should contain 30, 10, 60,50,90,80.

  b) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays
the elements which lie on diagonals.   [3]
    [Assuming the 2D array to be square matrix with odd dimension i.e. 3*3, 5*5, 7*7 etc….]
    Eg: 5 4 3
       6 7 8
       1 2 9
    Output through the function should be :
    Diagonal one : 5 7 9
    Diagonal two : 3 7 1

  c) An array MAT[10[11] is stored in the memory row wise with each element occupying 4 bytes
    of memory. Find out the base address and the address of element MAT[5][10], if the location of
   MAT[1][4] is stored at the address 2000.   [3]

d) An array Array[20][15] is stored in the memory along with column with each element occupying 8 bytes. Find out the base address and address of the element Array[2][3] if the element Array[4][5] is stored at the address 1000. [3]

4. a) Explain projection and selection operation with example. [2]

    b) Consider the following tables SCHOOL and ADMIN. Write SQL commands for the statements (i) to(iv) and give outputs for SQL queries (v) to (viii). [6]

SCHOOL

CODE	TEACHERNAME	SUBJECT	DOJ	PERIODS	EXPERIENCE
1001	RAVI SHANKAR	ENGLISH	12/03/2000	24	10
1009	PRIYA RAI	PHYSICS	03/09/1998	26	12
1203	LISA ANAND	ENGLISH	09/04/2000	27	5
1045	YASHRAJ	MATHS	24/08/2000	24	15
1123	GANAN	PHYSICS	16/07/1999	28	3
1167	HARISH B	CHEMISTRY	19/10/1999	27	5
1215	UMESH	PHYSICS	11/05/1998	22	16

ADMIN

CODE	GENDER	DESIGNATION
1001	MALE	VICE PRINCIPAL
1009	FEMALE	COORDINATOR
1203	FEMALE	COORDINATOR
1045	MALE	HOD
1123	MALE	SENIOR TEACHER
1167	MALE	SENIOR TEACHER
1215	MALE	HOD

  i) To display number of teachers in each subject.

  ii) To display CODE, TEACHERNAME and SUBJECT of all teachers who have joined the school after 01/01/1999.

iii) To display TEACHERNAME, PERIODS of all teachers whose number of periods are less than 25.

  iv) To display TEACHERNAME, CODE and DESIGNATION from tables SCHOOL and ADMIN whose gender is male.

  v) SELECT DESIGNATION, COUNT (*) FROM ADMIN GROUP BY DESIGNATION HAVING COUNT (*) <2;

  vi) SELECT COUNT (DISTINCT SUBJECT) FROM SCHOOL;

vii) SELECT MAX (EXPERIENCE), SUBJECT FROM SCHOOL GROUP BY SUBJECT;

viii) SELECT TEACHERNAME, GENDER FROM SCHOOL, ADMIN WHERE DESIGNATION = 'COORDINATOR' AND SCHOOL.CODE=ADMIN.CODE;

5.a) Expand the following [1]
     i. GSM   ii. GPRS

  b) Compare VB Script and ASP. [1]

  c) Define the term Bandwidth. Give any one unit of Bandwidth. [1]

  d) Difference between PAN and LAN. [1]

  e) Difference between Virus and Trojan [1]

  f) Expand FSF and GNU. [1]

g) East and West Public Ltd has decided to network all its offices spread in five building as shown below: [4]
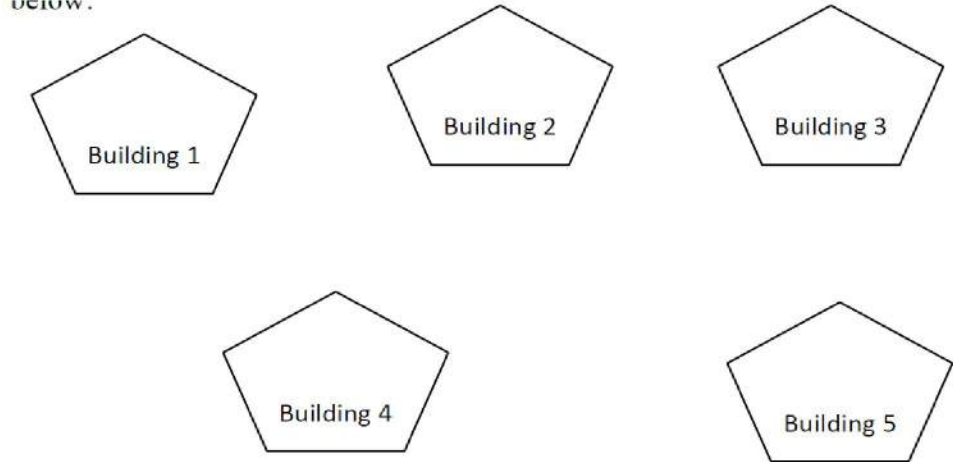
The distance between various buildings is as follows:

Building 1 to Building 2	20m
Building 3 to Building 5	70m
Building 2 to Building 3	50m
Building 1 to Building 5	65m
Building 3 to Building 4	120m
Building 2 to Building 55	50m

Building 4 to Building 55 30m
    Number of Computers in each building:
            Building 1 40
            Building 2 45
            Building 3 110
   Building 4 60
            Building 5 70

(i) Suggest a cable layout for connecting all the buildings together.
(ii) Suggest the most suitable building to install the server of the organization with a suitable reason.
(iii) Building 3 is used for many critical operations. It is tried that PC gets maximum possible bandwidth. Which network device is/should be used for this?
(iv) The organization also has another office in same city but at a distant location about25-30 Km away. How can link be established with building 1. (Suggest the transmission media).

6. c) Write the equivalent Boolean Expression F for the following **circuit diagram** : [2]
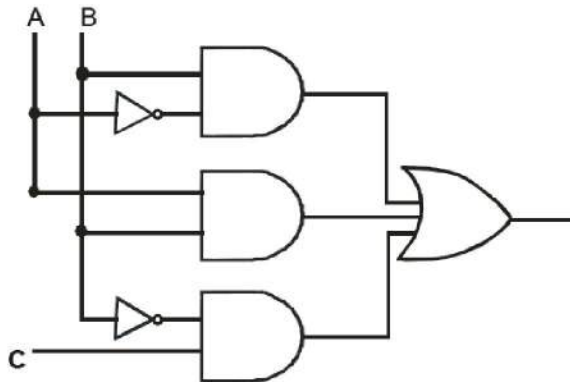
d) Reduce the following Boolean Expression using K-map:
    $F (X, Y, Z, W) = \sum(0,1,3,4,5,7,9,10,11,13,15)$ [3]
a) Verify demorgan's law (any one) using algebric method. [2]
b) Convert the following Boolean expression into its equivalent Canonical Product of Sum form: [1]
    X.Y'.Z+X'.Y.Z+X'Y.Z'

-x-x-x-x-x-x-