

Time Allowed: 3 hours  
Maximum Marks: 70

- i) Programming Language: C++*
- ii) All questions are compulsory.*

1. (a) Differentiate between ordinary function and member functions in C++. Explain with an example. 2
  - (b) Write the names of the header files to which the following functions belong: 1
    - i) setw( )
    - ii) isalnum( )
  - (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 being included in the program.  

```
void main()
{
cout<<"Enter an Alphabet:";
cin>>CH;
switch(CH)
case 'A' cout<<"Ant"; Break;
case 'B' cout<<"Bear" ; Break;
}
```
  - (d) Find the output of the following program: 3  

```
#include <iostream.h>
struct GAME
{ int Score, Bonus;
};
void Play(GAME &g, int N=10)
{ g.Score++;
  g.Bonus+=N;
}
void main( )
{ GAME G={ 110,50};
  Play(G,10);
  cout<<G.Score<<":"<<G.Bonus<<endl;
  Play(G);
  cout<<G.Score<<":"<<G.Bonus<<endl;
  Play(G,15);
  cout<<G.Score<<":"<<G.Bonus<<endl; }
```
  - (e) Write the output from the following C++ program code: 2

```

#include<iostream.h>
#include<ctype.h>
void strcon(char s[ ])
{
    int i,l;
    for(i=0,l=0;s[i]!='\0';i++,l++);
    for(int j=0; j<l; j++)
    {
        if(isupper(s[j]))
            s[j]=tolower(s[j])+2;
        else if(islower(s[j]))
            s[j]=toupper(s[j])-2;
        else
            s[j]='@';
    }
}
void main()
{
    char *c="Romeo Joliet";
    strcon(c);
    cout<<"Text= "<<c<<endl;
    c=c+3;
    cout<<"New Text= "<<c<<endl;
    c=c+5-2;
    cout<<"last Text= "<<c;
}

```

- (f) Study the following C++ program and select the possible output(s) from the options i) to iv). Also find the maximum and minimum value of L. 2

```

#include<stdlib.h>
#include<iostream.h>
#include<string.h>
void main()
{
    randomize();
    char P[ ]="C++PROGRAM";
    long L;
    for(int I=0;P[I]!='R';I++)
    {
        L=random (sizeof(L)) +5;
        cout<<P[L]<<"-";
    }
}

```

- i) R-P-O-R-      ii) P-O-R-+-      iii) O-R-A-G-      iv) A-G-R-M-

2. (a) Differentiate between data abstraction and data hiding. 2

- (b) Answer the questions(i) and (ii) after going through the following class: 2

```

class planet
{
    char name[20];
    char distance[20];
public:
    planet( ) //Function 1
    {
        strcpy(name, "Venus");
        strcpy(distance, "38 million km");
    }

    void display(char na[ ],char d[ ]) //Function 2
}

```

```
{ cout<<na<<"has "<<d<<" distance from Earth"<<endl; }
```

```
planet(char na[ ], char d[ ]) //Function 3
{ strcpy(name,na);
  strcpy(distance,d); }
```

```
~planet( ) //Function 4
{ cout<<"Planetarium time over!!!"<<endl; }
};
```

- (i) What is Function 1 referred as? When will it be executed?  
(ii) Write suitable C++ statement to invoke Function 3.

- (c) Define a class **Candidate** in C++ with the following specification :

4

**Private Members :**

A data member Rno(Registration Number) of type integer

A data member Cname of type string

A data member Agg\_marks (Aggregate Marks) of type float

A data member Grade of type char

A member function setGrade ( ) to find the grade as per the aggregate marks obtained by the student. Equivalent aggregate marks range and the respective grade as shown below.

Aggregate Marks	Grade
>=80	A
Less than 80 and >=65	B
Less than 65 and >=50	C
Less than 50	D

**Public members:**

A constructor to assign default values to data members:

Rno=0,Cname="N.A",Agg\_marks=0.0

A function Getdata ( ) to allow users to enter values for Rno, Cname, Agg\_marks and call function setGrade ( ) to find the grade.

A function dispResult( ) to allow user to view the content of all the data members.

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

4

```
class CUSTOMER
```

```
{ int Cust_no;
```

```
  char Cust_Name[20];
```

```
protected:
```

```
  void Register( );
```

```
public:
```

```
  CUSTOMER( );
```

```
  void Status( ); };
```

```
class SALESMAN
```

```
{ int Salesman_no;
```

```
  char Salesman_Name[20];
```

```
protected:
```

```
  float Salary;
```

```
public:
```

```
SALESMAN( );
void Enter( );
void Show( ); };
```

```
class SHOP : private CUSTOMER , public SALESMAN
{
char Voucher_No[10];
char Sales_Date[8];
public:
    SHOP( );
    void Sales_Entry( );
    void Sales_Detail( );
};
```

- (i) Write the names of data members which are accessible from objects belonging to class CUSTOMER.
- (ii) Write the names of all the member functions which are accessible from objects belonging to class SALESMAN
- (iii) Write the names of all the members which are accessible from member functions of class SHOP.
- (iv) How many bytes will be required by an object belonging to class SHOP?

3. (a) 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 as 0. 2

For example, if an array of 10 integers is as follows:

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
55	43	20	16	39	90	83	40	48	25

After executing the function, the array content should be changed as follows:

A[0]	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
5	0	5	0	0	5	0	5	0	5

- (b) Define a function **SWAPCOL ( )** in C++ to swap (interchange) the first column elements with the last column elements, of a two dimensional integer array. The array and its size are passed as the argument to the function. 3

Example: If the two dimensional array of size 4\*4 contains

```
2 1 4 9
1 3 7 7
5 8 6 3
7 2 1 2
```

After swapping of the content of 1<sup>st</sup> column and last column, it should be :

```
9 1 4 2
7 3 7 1
3 8 6 5
2 2 1 7
```

- (c) An array S[40][30] is stored in the memory along the column with each of the element occupying 4 bytes, find out the base address and address of element S[20][15], if an element S[15][10] is stored at the memory location 7200. 3

- (d) Write the definition of a member function **DELETE( )** for a class QUEUE in C++, to remove a 4

product from a dynamically allocated Queue of products considering the following code is already written as a part of the program:

```
struct PRODUCT
{
    int PID;
    char PNAME[20];
    PRODUCT *Next;
};
class QUEUE
{
    PRODUCT *R,*F;
public:
    QUEUE( )
        {R=NULL;
         F=NULL;}
    void INSERT( );
    void DELETE( );
    ~QUEUE( );
};
```

- (e) Evaluate the following postfix notation of expression using stack (Show status of Stack after execution of each operation) 2

4, 10, 5, +, \*, 15, 3, /, -

4. (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg() and tellg() functions for performing the required task. 1

```
#include <fstream.h>
class Item
{
    int Ino;
    char Iname[20];
public:
    //Function to count the total number of records
    int Countrec( );
};
int Item::Countrec( )
{
    fstream File;
    File.open("ITEM.DAT",ios::binary|ios::in);
    _____ // Statement 1 To position the file pointer
                                     // to the end of the file
    int Bytes = _____ // Statement 2 To return total number of
                                     // bytes from the beginning of the file
                                     // to the current position of the file pointer.

    int Count = Bytes / sizeof(Item);
    File.close();
    return Count; }
```

- (b) Write a function in C++ to read the content of a text file "PLACES.TXT" and display all those lines on screen, which are either starting with 'P' or starting with 'S'. 2

- (c) Write a definition for function BUMPER( ) in C++ to read each object of a binary file 3

GIFTS.DAT, find and display details of those gifts, which has remarks as “ON DISCOUNT”. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below:

```
class GIFTS
{
    int ID;
    char Gift[20], Remarks[20];
    float Price;
public:
    void Takeonstock( )
    {
        cin>>ID;
        gets(Gift);
        gets(Remarks);
        cin>>Price; }
    void See( )
    {
        cout<<ID<<": "<<Gift<<": "<<Price<<": "<<Remarks<<endl; }
    char *GetRemarks( )
    {
        return Remarks; }
};
```

5. (a) Differentiate between DDL & DML. Identify DDL & DML commands from the following:- 2  
(UPDATE, INSERT, ALTER, DROP)
- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which 6  
are based on the tables:

**TABLE :BOOK**

CODE	BNAME	TYPE
F101	The priest	Fiction
L102	German easy	Literature
C101	Tarzan in the lost world	Comic
F102	Untold Story	Fiction
C102	War Heroes	Comic

**TABLE: MEMBER**

MNO	MNAME	CODE	ISSUEDATE
M101	RAGHAV SINHA	L102	2016-10-13
M103	SARTHAK JOHN	F102	2017-02-23
M102	ANISHA KHAN	C101	2016-06-12

- (i) To display all details from table MEMBER in descending order of ISSUEDATE.
- (ii) To display the CODE and BNAME of all Fiction Type books from the table BOOK.
- (iii) To display the TYPE and number of books in each TYPE from the table BOOK.
- (iv) To display all MNAME and ISSUEDATE of those members from table MEMBER who have books issued (i.e ISSUEDATE) in the year 2017.
- (v) SELECT MAX(ISSUEDATE) FROM MEMBER;

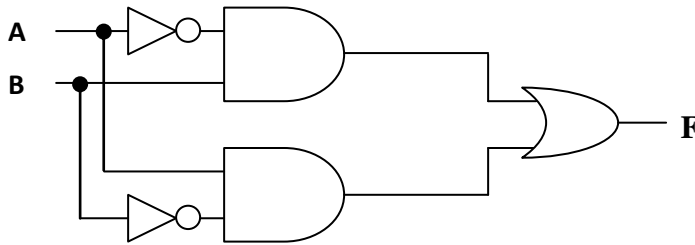
(vi) SELECT DISTINCT TYPE FROM BOOK;

(vii) SELECT A.CODE, BNAME, MNO, MNAME FROM BOOK A, MEMBER B  
WHERE A.CODE=B.CODE ;

(viii) SELECT BNAME FROM BOOK WHERE TYPE NOT IN ("Fiction", "Comic");

6. (a) State DeMorgan's Laws of Boolean Algebra and verify them using truth table. 2

(b) Write the equivalent Boolean Expression for the following logic circuit. 2



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

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

(d) Reduce the following Boolean Expression to its simplest form using K-Map. 3  
 $E(U,V,Z,W) = \sum (2,3,6,8,9,10,11,12,13)$

7. (a) Write two characteristics of Web 2.0. 1

(b) Expand the following terminologies: 1  
(i) VOIP (ii) CDMA

(c) Name one server side scripting language and one client side scripting language. 1

(d) What is the significance of cookies stored on a computer? 1

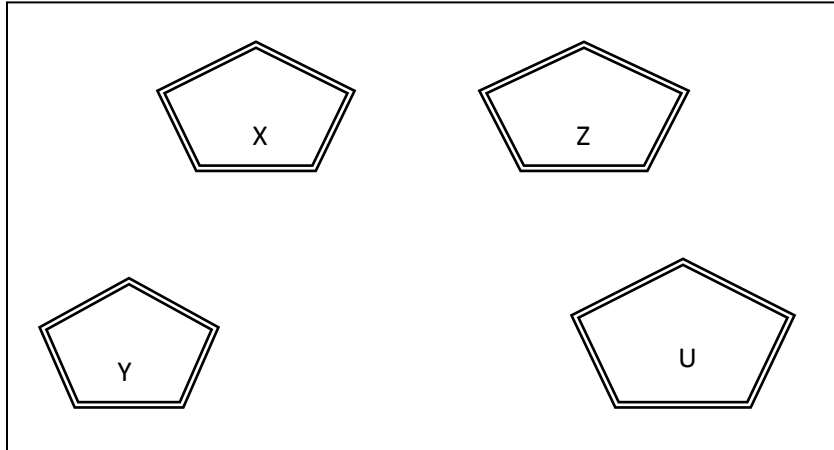
(e) Ashok wants to purchase a Book online and placed the order for that book using an ecommerce website. Now, he is going to pay the amount for that book online using his Mobile, he needs which of the following to complete the online transaction:- 1

1. A bank account,
2. A Mobile phone which is attached to above bank account,

3. The mobile banking app of the above bank installed on that mobile,
4. Login credentials(UserId & Password) provided by the bank,
5. All of above.

(f) What is the basic difference between Trojan Horse and Computer Worm? 1

(g) Quick Learn Organization has set up its new centre at Mangalore for its office and web based activities. The company compound has 4 buildings a shown in the diagram below:



Centre to centre distances between various buildings is as follows:

X to Y	50 m
Y to Z	150 m
Z to U	25 m
X to U	170 m
Y to U	125 m
X to Z	90 m

Number of computers in each building is as follows:

X Building	25
Y Building	50
Z Building	150
U Building	10

(i) Suggest a cable layout of connections between the buildings.

(ii) Suggest the most suitable place (i.e building) to house the SERVER of this organization with a suitable reason. 1

(iii) Suggest the placement of the following devices with justification: 1

(a) Repeater (b) Switch

(iv) The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed. 1

**End of the Question Paper**