All questions compulsory
Programming language C++
Maximum Marks 100
Time Allotted 3 Hours

Question I

[a] Differentiate between ***call by value & call by reference*** with suitable examples in reference to function. [2]

[b] ***Will*** the following ***program execute*** successfully? If no, state the reason(s): [2]

```
#include<iostream.h>
#include<stdio.h>
#define int M=3;
void main( )
{ const int s1=10;
int s2=100;
char ch;
getchar(ch);
s1=s2*M;
s1+M = s2;
cout<<s1<<s2 ;}
```

[c] Name the ***header files*** that shall be required for successful compilation of the following C++ program: [1]

```
main( )
{ char str[20];
cout<<fabs(-34.776);
cout<<"\n Enter a string : ";
cin.getline(str,20);
return 0; }
```

[d] Write the ***output*** of the following program: [3]

```
#include <iostream.h>
#include <string.h>
#include <ctype.h>
void swap(char &c1,char &c2)
{ char temp;
temp=c1;
c1=c2;
c2=temp;
}
void update(char *str)
{
int k,j,l1,l2;
l1 = (strlen(str)+1)/2;
```

```
l2=strlen(str);
for(k=0,j=l1-1;k<j;k++,j--)
{
if(islower(str[k]))
swap(str[k],str[j]);
}
for(k=l1,j=l2-1;k<j;k++,j--)
{
if(isupper(str[k]))
swap(str[k],str[j]);
}
}
void main()
{
char data[100]={"bEsTOfLUck"};
cout<<"Original Data : "<<data<<endl;
update(data);
cout<<"Updated Data "<<data;
}
```

[e] Give the ***output*** of the following program: [2]

```
#include<iostream.h>
void main( )
{
int Values [ ] = {2, 4, 8, 10};
int *ptr = Values;
for (int C = 0 ; C < 3 ; C ++)
{
cout<< *ptr << "@";
ptr ++;
}
cout << endl;
for ( C = 0 ; C <4 ; C++)
{
(*ptr) * = 3;
– –ptr;
}
for (C = 0; C< 4 ; C++)
cout<< Values [C ] << "%" ;
cout<< endl;
}
```

[f] Study the following program and select the ***possible output*** from it : [2]

```
#include<stdlib.h>
#include<iostream.h>
void main()
{
randomize();
char A[]="WELCOME";
int ToGo;
for(int I=0;I<strlen(A);I++)
{
```

```
ToGo=random (sizeof (ToGo)*2) +1;
cout<<A[ToGo]<<":";
}
}
```

a) W: E: L: C: O: M: E:
b) E: C: E: E: C: C: E:
c) E: C: E: E: C: C: O:
d) C: C: C: E: E: C: C:

Question II

[a] Define ***Multilevel & Multiple inheritance*** in context to OOP. Give suitable examples to illustrate the same. [2]

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

```
class number
{ float M;
char str[25];
public:
number( ) //constructor 1
{ M=0;
str='\0';}
number(number &t); //constructor 2
};
```

i) Write c++ statement such that it invokes constructor 1.
ii) Complete the definition for constructor 2.

[c] Consider the following code: [2]

```
class ci
{
int L;
public:
ci (int j) { L = j; } //function 1
ci (ci & rv ) { L = rv.L; } //function 2
void initialize() { L = 0; }
};
```

Referring to the sample code above answer the questions (i) and (ii).
(i)How would function1 and function2 get executed? Give example.
(ii)main()

```
{
ci original (1);
ci X1(original);
ci X2 = original;
}
```

Referring to above sample code, what initializes the object X1?
(i) initialize () function (ii) The default constructor
(iii) The copy constructor (iv) The default copy constructor
Justify your answer.

[d] ***Define a class*** Movie in C++ with the description given below: [4]

Private Members:
Name_of_movie of type character array(string)
Date_of_release of type character array(string)
Name_of_director of type character array(string)
Star of type int

Total_print_release of type int
Public Members:
A constructor to assign initial values as follows:
Name_of_movie NULL
Date_of_release 1/1/2007
Name_of_director NULL
Star 2
Total_print_release 100
A function calculate_star() which caculates and assigns the value of data member Star as follows:
Total Print Release Star
>= 1000 5
< 1000 & >=500 4
< 500 & >=300 3
< 300 & >=100 2
< 100 1
A function EnterMovie() to input the values of the data members Name_of_movie, Date_of_release, Name_of_director and Total_print_release
A function ShowMovie() which displays the contents of all the data members for a movie.

[e] Answer the questions (i) and (ii) after going through the following class. [2]

```
class Exam
{ char Subject[20] ;
int Marks ;
public :
Exam( ) // Function 1
{ strcpy(Subject, “Computer” ) ;
Marks = 0 ; }
Exam(char P[ ]) // Function 2
{ strcpy(Subject, P) ;
Marks=0 ; }
Exam(int M) // Function 3
{ strcpy(Subject,”Computer”) ;
Marks = M ; }
Exam(char P[ ], int M) // Function 4
{ strcpy(Subject, P) ;
Marks = M ; }
};
```

(i)Which feature of the Object Oriented Programming is demonstrated using Function 1, function2, Function 3 and Function 4 in the above class Exam?
(ii)Write statements in C++ that would execute Function 3 and Function 4 of class Exam.

Question III

[a] Answer the questions (i) to (iv) based on the following code : [4]

```
class Goods
{
int id;
protected :
char name[20];
```

```
long qty;
void Incr(int n);
public :
Goods();
~Goods();
void get();
};
class Food_products : protected Goods
{
char exp_dt[10];
protected :
int id;
int qty;
public :
void getd();
void showd();
};
class Cosmetics : private Goods
{
int qty;
char exp_date[10];
protected :
int id;
public :
~Cosmetics();
Cosmetics();
void show();
};
```

1.Name the all protected members of class Food_products.

2.Name the member functions accessible through the object of class Food_products.

3.From the following, Identify the member function(s) that cannot be called directly from the object of class Cosmetics

show()
getd()
get()

4.If the class cosmetics inherits the properties of food_products class also, then name the type of inheritance.

[b] Define ***Multilevel & Multiple inheritance*** in context to OOP. Give suitable examples to illustrate the same. [2]

[c] Differenciate between ***default*** & ***parameterized*** constructor with suitable example. [2]

[e] Answer the questions (i) to (iv) based on the following : [4]

```
class COMP
{ private :
        char Manufacturer [30];
char addr[15];

          public:
           toys( );
```

```
            void RCOMP( );
            void DCOMP( );
    };
    class TOY: public COMP
    {       private:
            char bcode[10];
            public:
            double cost_of_toy;
            void RTOY ( );
            void DTOY( );
    };
  class BUYER: public TOY
    { private:
    char nm[30];
    char delivery date[10];
    char *baddr;
    public:
    void RBUYER( );
    void DBUYER( );
    };
    void main ( )
    {    BUYER MyToy;    }
```

(i)Mention the member names that are accessible by MyToy declared in main( ) function.
(ii)Name the data members which can be accessed by the functions of BUYER class.
(iii)Name the members that can be accessed by function RTOY( ).
(iv)How many bytes will be occupied by the objects of class BUYER?

[f] ***Reusability*** of classes is one of the major properties of OOP. How is it implemented in C+++? [2]

Question IV

[a] Write a function in ***SORT_MARKS( )*** in C++ to sort an array of structure Student in Ascending order of Marks using ***Bubble sort***. [3]
Note: Assume the following definition of structure Student

```
Struct Student
{
int RollNo;
char Name[25];
float Marks;
};
```

[b] A 2-d array defined as A[4..7, -1..3] requires 2 words of storage space for each element stored in row major order. Calculate the ***address of A[7,0]*** and ***base address*** if the location of A[6,2] as 126. [3]

[c] Why are arrays called ***static data structure***? [1]

[d] Given a two dimensional array AR[5][10], base address of AR being 1000 and width of each element is 8 bytes. ***Find the location of AR[3][6]*** when the array is stored as **a) Column wise b) Row wise** . [3]

[e] Write a function in C++ to take a two dimensional array of integer as argument and display the two digits numbers only. For example if the content of the array is

2 34 56
7 453 90
11 342 4
Then the function will print: 34, 56 , 90 , 11 [3]

[f] Suppose A, B, C are the array of integers having size m, n, m+n respectively .The elements of array A appear in ascending order, the elements of array B appear in descending order. Write a UDF in C++ to produce third array C after ***merging*** arrays A and B in ascending order. Take the arrays A, B and C as argument to the function. [3]

[g] Write a program to demonstrate ***selection sort***. [3]

[h] What are the ***precondition***(s) for Binary Search ? Write the ***algorithm*** for binary search. [3]

Question V

[a] **Evaluate** the following postfix expression using a stack and show the Contents of stack after execution of each operation: [2]
TRUE,FALSE, TRUE,FALSE, NOT, OR, TRUE , OR,OR,AND

[b] Define function **stackpush( )** to insert nodes and **stackpop( )** to delete nodes, for a linklist implemented stack having the following structure for each node: [4]

```
Struct Node
{ char name[20];
int age;
Node *Link;
};
class STACK
{ Node * Top;
Public:
STACK( ) { TOP=NULL;}
Void stackpush( );
Void stackpop( );
~STACK( );
};
```

[c] Give necessary declarations for a **queue** containing *name and float type number*; also write a user defined function in C++ to ***insert*** *and* ***delete*** *a node* from the queue. You should use linked representation of queue . [4]

[d] Evaluate the following notation of expression into ***postfix*** and show status of stack after execution of each operation: [2]
120, 45, 20, +, 25, 15, –, +, *

[e] Convert the following infix notation into ***postfix*** expression: [2]
(A+B)*C-D/E*F

Question VI

[a] What is Primary key? Explain with a suitable example. [1]

[b] Define ***drop table*** and ***drop view*** in context to SQL. [1]

[b] Consider the following table FLIGHT and FARES. Write the SQL commands for the statements (i) to (iv) and output from (v) to (viii). [6]

Table: FLIGHT

FL_NO	DEPARTURE	ARRIVAL	NO_FLIGHTS	NOOFSTOPS
IC301	MUMBAI	DELHI	8	0

IC799	BANGALORE	DELHI	2	1
MC101	INDORE	MUMBAI	3	0
IC302	DELHI	MUMBAI	8	0
AM812	KANPUR	BANGALORE	3	1
IC899	MUMBAI	KOCHI	1	4
AM501	DELHI	TRIVANDRUM	1	5
MU499	MUMBAI	MADRAS	3	3
IC701	DELHI	AHMEDABAD	4	0

Table: FARE

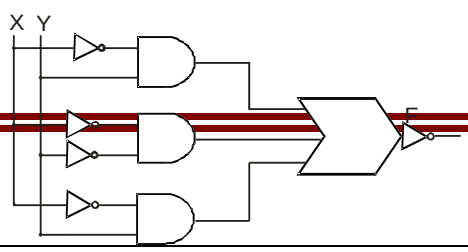
FL_NO	AIRLINES	FARE	TAX%
1C701	Indian Airlines	6500	10
MU499	Sahara	9400	5
AM501	Jet Airways	13450	8
IC899	Indian Airlines	8300	4
1C302	Indian Airlines	4300	9
1C799	Indian Airlines	10500	10
MC101	Deccan Airlines	3500	4

(i)Display Flight No, No of Flights arriving to the DELHI
(ii)Display all the airlines that have maximum no of flights.
(iii)Display total fare of all the airlines.
(iv)To display departure and arrival points of flight no 1C302 and MU499.
Give the Output:
(v)SELECT COUNT(DISTINCT FL_NO) FROM FLIGHT;
(vi)SELECT MIN(NOOFSTOPS) FROM FLIGHT WHERE FL_NO = 'IC899';
(vii)SELECT AVG(FARE) FROM FARE WHRE AIRLINES = 'Indian Airlines';
(viii)SELECT FL_NO, NO_FLIGHTS FORM FLIGHT WHERE DEPARTURE='MUMBAI';

Question VII

[a] State and verify ***absorption law*** using truth table and algebraically. [2]

[b] Write the ***equivalent Boolean Expression*** for the following logic circuit:



[c] Given the following truth table, derive the ***Sum of Product*** Boolean Expression for it: [1]

X	Y	Z	F(X, Y, Z)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

[d] Reduce the following Boolean Expression using K-map: [3]
F (X, Y, Z, W) = ∑(0,1,2,4,5,7,8,9,10,11,14)

[e] State ***De'Morgans law*** and verify one of the laws (algebraic). [2]

[f] Draw the Logical circuit of the following expression with the help of NAND gate only [1]

x+yz

[g] Find the ***complement*** of: [2]
F(a,b,c,d) = [a' + { (b+c).(b'+d')}]

Question VII

[a] Observe the program segment given below carefully and fill in the blanks marked as statment1 and statement2 using write() and remove() functions for performing the required task. [1]

```
#include<fstream.h>
class Emp
{
int Eno;
char name[20];
public :
//function which will delete the data of a specific employee
void deleteRec(int Eid);
```

```
};
void Emp::deleteRec(int Eid)
{
fstream file;
file.open("Emp.dat",ios::in|ios::out|ios::binary);
ofstream ofile("temp.dat");
while(file)
{
file.read((char *)this,sizeof(eobj));
if(this->Eno !=Eid)
_____//statement1
}
_____//statement 2
rename("temp.dat","emp.dat");
}
```

[b] A "student.dat" file exists, with the object of class students. Assuming, the file has just been opened through the object **fil** of stream class [1]

i) Give a single command to place the file pointer to the third record from beginning.

ii) In continuation to above command, give a command to bring file pointer to the beginning of last record.

[c] Write a function in C++ to print the count of the word ***'the'*** as an independent word in a text file STORY.TXT [2]

For example, if the content of the file STORY.TXT is

There was a monkey in **the** zoo. **The** monkey was very naughty.

Then the output of the program should be 2.

[d] Consider the following class declaration: [3]

```
class bank
{
int accno;
char name[20]
float balance;
public:
void input( )
{
cin>>accno>>name>>balance;
}
void display( )
{
cout<<accno<<" "<<name<<balance<<endl;
}
float getbalance( )
{
return balance;
}
};
```

Give function definition to the following

(i)Write a function in C++ to accept the object of class bank from the user and **write** to a binary file " BANK.DAT"

(ii)Write a function in C++ to read the objects of bank from a binary file and **display all the objects** on the screen where balance is more the Rs. 25000.

ЖЖЖЖЖЖЖЖЖ

"Success is the sum of small efforts, repeated day in and day out."