

**Computer Science
Class XII**

Time: 3 Hrs.

M.M. 70

General instructions:

- 1) All questions are compulsory.
- 2) Read all the questions carefully.
- 3) Programming language C++.

Q.1(a) What do you mean by polymorphism? Explain with suitable example? [2]

(b) Name the header file associated with the following function: [1]

(i) randomize () (ii) delay()

(c) Find the output of the following program: [2]

```
#include<iostream.h>
#include <string.h>
#include <ctype.h>
void Convert (char Str[ ], int Len)
{
    for (int Count =0; Count < Len; Count++)
    {
        if(isupper(Str[Count+]))
            Str[Count] = tolower(Str[Count]);
        else if (islower(Str[Count]))
            Str[Count] = toupper(Str[Count]);
        else if (isdigit(Str[Count]))
            Str[Count] = Str[Count] + 1;
        else Str[Count] = '*';
    }
}
void main ( )
{
    char Text[] = "CBSE Exam 2005";
    int Size = strlen(Text);
    Convert (Text, Size);
    cout << Text << endl;
    for(int C =0, R = Size -1; C<= Size/2; C++, R- - )
    {
        char Temp = Text[C];
        Text[C] = Text[R];
        Text[R] = Temp;
    }
    cout << Text <<endl;
}
```

- (d) Rewrite the following program after removing all the syntax error(s), if any. [2]

```
include <iostream.h>
void main ( )
{
    int P [ ] = {90, 10, 24, 15}; Q, Number = 4;
    Q = 9;
    for[ int I= Number -1; I > =0, I - -]
    switch (I)
    {
        case 0:
        case 3: cout >> P[I] *Q <<endl; break;
        case 1:
        case 2: cout << P[I] + Q;
    }
}
```

- (e) Write the output of the following program: [2]

```
#include <iostream.h>
int max (int &x, int &y, int &z)
{
    if (x >y && y > z)
    {
        y ++;
        z ++;
        return x;
    }
    else
        if (y >x)
            return y;
        else
            return z;
}
void main ( )
{
    int a = 10, b = 13, c = 8 ;
    a = max (a, b, c);
    cout << a << b << c << endl;
    b = max (a, b, c);
    cout << ++ a << ++ b << ++ c << endl;
    c = max (a, b, c);
    cout << a++ << ++b << ++c << endl;
}
```

- (f) In the following program, if the value of N given by the user is 15, what maximum and minimum values the program could possible display? [2]

```
#include <iostream.h>
#include <stdlib.h>
void main ( )
{
    int N, Guessme;
    randomize( );
    cin >> N;
    Guessme = random(N) + 10;
    cout << Guessme << endl;
}
```

- Q.2 (a) What do you understand by Copy Constructor? Explain with suitable example. [2]

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

```
class Travel
{
    int days;
public:
    Travel ( ) // Function 1
    {
        Days = 50; cout << " Journey starts now" << endl;
    }
    void sightseeing( ) // Function 2
    {
        cout << " Sightseeing in the journey starts" << endl;
    }
    Travel (int Duration) // Function 3
    {
        Days = Duration; cout << " Journey starts now" << endl;
    }
    ~ Travel ( ) // Function 4
    {
        cout << " Happy journey" << endl;
    }
};
```

- (i) In Object Oriented Programming, what is Function 4 referred as and when does it get invoked/ called?
- (ii) In Object Oriented Programming, which concept is illustrated by Function 1 and Function 3 together? Write an example illustrating the calls for these functions.
- (c) Define a class POWER in C++ with following description: [4]

Private Members:

MNO of type long (Meter Number)

Name of type string (Consumer's Name)
 Units of type long (Power Unit's Consumed)
 Charges of type float (Charges to be paid by Consumer)
 A member function **CALCCHARGE()** to calculate Charges according to the following conditions:

Units	Charges
Below 100 Units	Rs. 2.00 per Unit
Below 200 Units and ≥ 100 Units	Rs. 3.00 per Unit
≥ 200 Units	Rs. 5.00 per Unit

For Example:

If the Units are 132, Charges should be calculated as

$$\text{Charges} = 99 * 2 + (\text{Units} - 99) * 3;$$

If the Units are 392, Charges should be calculated as

$$\text{Charges} = 99 * 2 + 100 * 3 + (\text{Units} - 199) * 5;$$

Public Members

A Function **Enterdata()** to allow user to enter values for Mno, Name, Units & call the function **CAICCHARGES()** to calculate the Charges.

A Function **ShowBill()** to allow user to view the content of all the data members.

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

```
class Car
{
    char Model[10];
    char Date_of_purchase[10];
    char Company[20];
    public( );
    Car( );
    void entercardetail( );
    void showcardetail( );
};
class Accessories : public Car
{
    protected:
    char stereo_tape[30];
    char sheet_cover[20];
    public:
    float Price;
    Accessories( );
    void enteraccessoriesdetails( );
    void showaccessoriesdetails( );
};
class Dealer : public Accessories
{
```

```
int No_of_dealers;
char dealers_name[20];
int No_of_products;
public:
Dealer( );
void enterdetails( );
void showdetails( );
};
```

- (i) How many bytes will be required by an object of class Car and an object of class Dealer.
- (ii) Write names of all the data members which are accessible from the objects of class Dealer.
- (iii) Write names of all the members accessible from member functions of class Accessories.
- (iv) Write names of all the member functions which are accessible from objects of class Dealer.

Q.3 (a) Given two arrays a and b of sizes m and n respectively. Write a function `mixab(int a[], int m, int b[], int m, int c[])`; [3]
which takes two arrays and their sizes as arguments and creates an array c such that:

- (i) all even nos. of array which are at even position are copied in c.
- (ii) after that all even nos. of b array which are at odd positions are copied in c.
- (iii) after that remaining elements of a are copied in c.
- (iv) after that remaining elements of b are copied in c.

(b) Each element of an array `DATA[20][50]` requires 4 bytes of storage. The base address of data is 2000. Determine the location of `DATA[10][10]` when the array is stored as : (a) row- major (b) column – major. [4]

(c) Define functions `stackpush()` to insert nodes and `stackpop()` to delete nodes, for a linked list 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( );
```

```
};
```

(d) Obtain the postfix notation for the following infix notation of expression showing the contents of the stack and postfix expression formed after step of conversion: [2]

$A * B + (C - D / F)$

(e) Write a function in C++ to print the sum of all the values which are divisible by 10 or 20 present in a two dimensional array passed as the argument to the function. [3]

Q.4 (a) Observe the program segment given carefully, and answer the question that follows: [1]

```
class Joy
```

```
{
```

```
int Joy_id;
```

```
char Joy_name[20];
```

```
public :
```

```
// function to enter Joyians details
```

```
void enterdetails ( );
```

```
// function to display Joyians details
```

```
// function to return Joy_id
```

```
int AJoy_id( ) { return Joy_id; }
```

```
};
```

```
void Modify ( JOY NEW)
```

```
{
```

```
fstream File;
```

```
File.open ("JOY.DAT", ios :: binary | ios :: in | ios :: out);
```

```
JOY OB;
```

```
int Recordsread = 0, Found = 0;
```

```
while (!Found && File.read (( char*) & OB, sizeof(OB)))
```

```
{
```

```
Recordsread++;
```

```
if(NEW.AJoy_id( ) == OB.AJoy_id( ))
```

```
{
```

```
_____ // Missing Statement
```

```
File.write ((char * )&NEW,sizeof(NEW));
```

```
Found = 1;
```

```
}
```

```
else
```

```
File.write((char *)&OB, sizeof(OB));
```

```
}
```

```
if (!Found)
```

```
cout << "Record for modification does not exist";
```

```
File.close ( );
```

```
}
```

If the function Modify() is supposed to modify a record in file JOY.DAT with the values of JOY NEW passed to its argument, write the appropriate statement for Missing Statement using seekp() and seekg(), whichever needed, in the above code that would write the modified record at its proper place.

(b) Assuming that a text file Joy.TXT contains some text written into it, write a function named vowelwords, that reads the file JOY.TXT and creates a new file names JOY1.TXT which start with a lowercase vowel (i.e., with ‘a’, ‘e’, ‘o’, ‘i’, ‘u’). For example if the file JOY.TXT contains [2]

Carry umbrella and overcoat when it rains
Then the file JOY1.TXT shall contain
Umbrella and overcoat it

(c) Write a function in C++ to search for a room-number (RoomNo) given by the user in an already existing binary is called ‘Hospital.Dat’. Also display complete record of the room-no searched if found otherwise display a message ‘not found’. [3]

```
class Hospital
{
    int Room_No;
    char Patient_N [30];
    public :
    void Input( ) { gets (Patient_N); cin >> Room_No; }
    void Output( )
    {
        cout << "Patient's Name:" << Patient_N << endl;
        cout << 'Room Number:' << Room_No << endl;
    }
    int Getroom( ) { return Room_No; }
};
```

Q.5 (a) What is key in RDBMS? What are different key constraints? [2]

(b) Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii): on the basis of the table [6]

BOOKS

Book_Id	Book_Name	Author_name	Publishers	Price	Type	Quantity
F0001	The Tears	William Hopkins	First Publ.	750	Fiction	10
F0002	Thunderbolt	Anna Roberts	First Publ.	700	Fiction	5
T0001	MyFirstC++	Brain & Brooke	EPB	250	Text	10
T0002	C++Brain	A.W. Rossaine	TDH	325	Text	5
C0001	Fast Cook	Lata Kapoor	EPB	350	Cooke ry	8

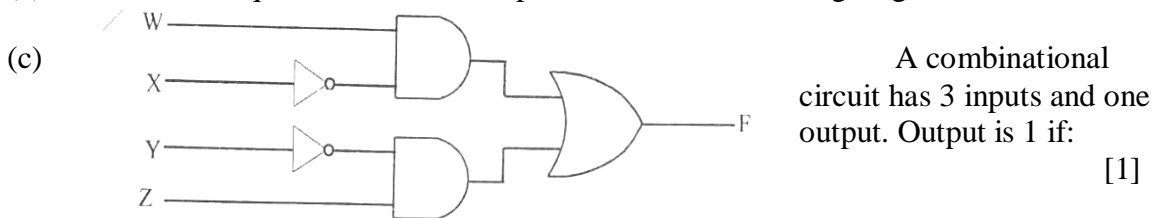
ISSUED

Book_Id	Quantity_Issued
F0001	3
T0001	1
C0001	5

- (a) To show Book name, Author name and Price of books of EPB Publishers.
- (b) To list the names from books of Fiction type.
- (c) To display the names and price of the books in descending order of their price.
- (d) To increase the price of all books of First Publ. Publishers by 50.
- (e) To display the Book_Id, Book_Name and Quantity_Issued for all books which have been issued. (The query will require contents from both the tables.)
- (f) To insert a new row in the table Issued having the following data: 'F0002', 4.
- (g) Give the output:
 - (i) SELECT COUNT (DISTINCT Publishers) FROM Books;
 - (ii) SELECT SUM(Price) FROM Books WHERE Quantity > 5;
 - (iii) SELECT Book_Name, Author_Name FROM Books WHERE Price <500;
 - (iv) SELECT COUNT (*) FROM Books;

Q.6 (a) State and Verify Absorption law in Boolean Algebra. [2]

(b) Write the equivalent Boolean expression for the following Logic Circuit: [2]



- (i) All the inputs are equal to 1.
 - (ii) None of the inputs are equal to 1.
 - (iii) An odd number of inputs are equal to 1.
 - (I) Obtain the truth table
 - (II) Find the simplified output function in POS form
- (d) Reduce the following Boolean expression using K- Map: [3]
 $F(A, B, C, D) = \sum (0, 1, 2, 3, 4, 5, 10, 11, 15)$

Q.7(a) What is the difference between Absolute and Relative URL? [1]

(b) Expand the following terminologies: [1]

- (i) CSMA / CD
- (ii) WLL

(c) What is the utility of Cyber law? [1]

(d) What do you understand by the terms Gopher and Archie. [1]

(e) The Reliance Info Sys has set up its Branch at Srinager for its office and web based activities. It has 4 Zone of buildings as shown in the diagram:



Center to center distances various blocks

Zone X to Zone Z	40 m
Zone Z to Zone Y	60 m
Zone Y to Zone X	135 m
Zone Y to Zone U	70 m
Zone X to Zone U	165 m
Zone Z to Zone U	80 m

Number of Computers

Zone X	50
Zone Z	130
Zone Y	40
Zone U	15

- (e1) Suggest a most suitable cable layout of connections between the Zones and topology. [1]
- (e2) Suggest the most suitable place (i.e., Zone) to house the server of this organization with a suitable reason, with justification. [1]
- (e3) Suggest the placement of the following devices with justification: [1]
 (1) Repeater (2) Hub / Switch
- (e4) The organization is planning to link its head office situated in Mumbai at the offices at Srinager. Suggest an economic way to connect it; the company is ready to compromise on the speed of connectivity. Justify your answer. [1]