2019 III 18 | 1000 | Seat No. | | | | | |

Time : 2½ Hours

COMPUTER SCIENCE

Subject Code

H	7	0	5

Total No. Of Questions : 28 **(Printed Pages : 12)** **Maximum Marks : 55**

INSTRUCTIONS: *i)**All** questions are **compulsory**, however there is an internal choice for question number **22,27,28.***

*ii)Question number from **1** to **5** must be attempted **once**.*

*iii)Programs should be written in **c++ only.***

*iv) State your assumptions **clearly.***

*Section **A**: Consists of **10** questions of **01** mark **each**.*

*Section **B**: Consists of **11** questions of **02** marks **each**.*

*Section **C**: Consists of **05** questions of **03** marks **each**.*

*Section **D**: Consists of **02** questions of **04** marks **each**.*

SECTION -A

1. Write the **CORRECT** alternative from those given below: **[1]**

The process of deriving a new class from an existing class is known as

_____

- Polymorphism
- Encapsulation
- Inheritance
- Abstraction

2. Write the **CORRECT** alternative from those given below: **[1]**

New elements are added to the queue from the _____

- Front
- Rear
- Top
- None of these

3. Write the **CORRECT** alternative from those given below: **[1]**

Stream objects that perform **both** input and output operations on files must be of _____ class type.

- iostream
- fstream
- ifstream
- ofstream

4. Write the **CORRECT** alternative from those given below: **[1]**

Which of the following gates is a universal gate.

- AND
- NAND
- XOR
- OR

5. Write the **CORRECT** alternative from those given below: **[1]**

A computer system or a group of computer systems that reinforce information security between two networks is called_____

- Bridge
- Gateway
- Modem
- Firewall

6. What is containership in c++? **[1]**

7. What is a circular linked list? **[1]**

8. Write the name of the linear data structure which follows Last In First Out (LIFO) mechanism . **[1]**

9. Define gateway in a computer network. **[1]**

10. Define topology in a computer network. **[1]**

SECTION -B

11. Given the following c++ code answer the questions (i) and (ii) **[2]**

```
#include <iostream.h>
using namespace std;
class TestMeOut
{
    public:
    ~TestMeOut()                                    //Function 1
    {
        cout<<" Leaving the examination hall "<<endl;
    }
    TestMeOut()                                     //Function 2
    {
        cout<<"Appearing for examination "<<endl;
    }
    void MyWork()                                   //Function 3
    {
        cout<<"Attempting Questions "<<endl;
    }
};
```

i) In Object Oriented Programming what is **Function 1** referred as and when does it get invoked / called?

ii) In Object Oriented Programming what is **Function 2** referred as and when does it get invoked / called?

12. State **any two** points of difference between Object Oriented Programming and Procedure Oriented Programming. **[2]**

13. Determine the output of the following C++ program **[2]**

```
#include <iostream.h>
using namespace std;

void main()
{
        int i=0 ,j=3;
        for(--i&&j++;i<7;i+=2)
        {
                cout<<i<<"\t"<<j<<endl;
        }
}
```

14. State **any two** points of difference between call by value and call by reference. **[2]**

15. With reference to the given postfix expression, Explain the concept of postfix evaluation using stacks. **[2]**

11, 5, -, 6, 8, +, 12, *, /

16. Write a c++ program that reads a text file named **"SAMPLE.TXT"** and creates another text file **"RESULT.TXT"**, such that it is identical except that every sequence of consecutive blank space is replaced by a single space. **[2]**

17. List the **two** methods used to open a file, when is one method preferred over the other? **[2]**

18. Draw the logic circuit diagram for the following boolean expression using **NAND** gates only. **[2]**

X' Y + Y' Z

19. Prove Algebraically **[2]**

XY + X'Z + YZ = XY + X'Z

20. Give **two points** of difference between Message Switching and Packet switching. **[2]**

21. State **two advantages** of Star topology over Bus topology. **[2]**

SECTION -C

22. Write a user defined function named **draw1()** in C++ which accepts a positive integer 'n' as parameter and generates the following pattern for 'n' lines. **[3]**

if n=5

5 5 5 5 5
4 5 5 5 5
3 4 5 5 5
2 3 4 5 5
1 2 3 4 5

OR

Write a user defined function named **draw2()** in C++ which accepts a positive integer 'n' as parameter and generates the following pattern for 'n' lines. **if n=3**

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

23. Write a user defined function **Pell()** which accepts a positive integer number ' n' from the user to generate 'n' pell numbers. **[3]**

    NOTE: A Pell number series starts with **0** and **1**, and the next pell is calculated by multiplying the recent pell number by 2 and adding it to the previous pell number. pell series: **0 1 2 5 12 29 70....**

    eg. **0+1*2= 2** **1+2*2=5** **2+5*2=12**

24. Consider the following c++ program and answer the questions below. **[3]**

```
#include<iostream.h>
using namespace std;

class person
{
int marks;
char name[20];

public:

void getd()
{
    cin>>name;
    cin>>marks;
}
```

```
        void putd()
        {
            cout<< name << marks <<endl;
        }

        int retmarks()
        {
            return marks;
        }
};

int main()
{
        person p1[5],p2[5],p3[10];
        int i, j,k,m;
        cout<<"enter marks for obj1\n";
        for(i=0;i<5;i++)
        {
            p1[i].getd();
        }

        cout<<"enter marks for obj2\n";
        for(i=0;i<5;i++)
        {
            p2[i].getd();
        }

        // MISSING CODE

        cout<<"contents of the 3rd object\n";
            for(m=0;m<10;m++)
        {
            p3[m].putd();
        }

}
```

Assume that **p1** and **p2** are sorted on marks in ascending order.

Write **ONLY** the **MISSING CODE** to merge **p1** and **p2** to obtain **p3** in ascending order of marks.

25. Observe the program segment carefully and answer the question that follows: **[3]**

```
class student
{
    int student_no;
    char student_name[20];
    int mark;
    public:
    void EnterDetails()
    {
            cin>>student_no>>mark;
            gets(student_name);
    }
    void ShowDetail();

    int GetMark()
    {
            return mark;
    }
};
```

Assume that a binary file **"RESULT.DAT"** contains records belonging to class **student** , Write a user defined function **copy()** to create the following files based on the given criteria.

i) **"EXCELLENT.DAT"** - contains all records who secured marks greater than 79.

ii) **"AVERAGE.DAT"** - contains all records who secured marks greater than 59 but less than 80.

26. Obtain a simplified **SOP** form for the following boolean expression using **K-MAP** **[3]**

$F(A,B,C,D)=\sum(0,1,2,4,5,7,8,9,10,11,14)$

SECTION -D

27. Declare a class **HOSPITAL** consisting of the following members: **[4]**

Under private visibility label

illness: of type char size 30,

Under **public** visibility label

constructor to initialize illness to " Motor Neuron Disease"

Under **protected** visibility label

Display1(): function to display illness.

Declare a class **PERSON** consisting of the following members:

Under **private** visibility label

name: of type char size 20,

age: of type integer.

Under **public** visibility label

constructor to initialize name to " Hawking" and age = 76

Under **protected** visibility label

Display2(): function to display name and age.

Derive class **PATIENT** from above two classes in **private** mode ,it also has **private** data member **dob** of type char of size 20.

Under **public** visibility label

constructor to initialize dob to "8-January -1942"

Display3(): function to display dob.

Write a **main** function to display output as follows

Name: Hawking
Age :76
Illeness: Motor Neuron Disease
Dob: 8-January -1942

OR

Declare a class **DEPARTMENT** consisting of the following members:

Under **protected** visibility label

name: of type char size 20

Under **public** visibility label

parameterized constructor to initialize value for name

Declare a class **SALARY** consisting of the following members:

Under **private** visibility label

pay: of type float.

Under **public** visibility label

parameterized constructor to initialize value for pay

Declare class **EMPLOYEE** with following data members

Under **protected** visibility label

Empid: of type integer

d: of type department

s: of type salary

Under **public** visibility label

parameterized constructor to initialize value for Empid and display all the data members(name,empid,pay).

Write a **main** function to create object of class **EMPLOYEE** to input and display all the data members.

28. Consider the following class declaration **[4]**

```
class vehicle
{
        struct node
        {
                int vno;            //stores vehicle number
                node *next;
        }*start;
        public:
        vehicle()
        {
                start=NULL;
        }
        void create();              // creates a linkedlist
        void display();             // displays contents of the linked list
        void discard();             // deletes a node from the linked list
};
```

Assume there are unique **vehicle** numbers stored in a linked list, write a user defined function **discard(),** that will search for a vehicle number and delete it from the linked list.

OR

Consider the following class declaration

```
class footwear
{
        struct node
        {
                int shoesize;          //stores shoe size
                node *next;
        }*start;
        public:

        footwear()
        {
                start=NULL;
        }
        void insert();                  // creates a sorted linkedlist
        void display();                 // displays contents of the linked list
};
```

Assume there are shoe sizes stored in a **sorted(ascending)** linked list, write a user defined function **insert()** that will insert a new node at an appropriate position in the sorted linked list.