

2019 VI 07

(0930)

Seat No.

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Time : 2½ Hours

COMPUTER SCIENCE

Subject Code

H	7	0	5
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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 numbers **22**, **27** and **28**.
 - (ii) Question numbers **1** to **5** should be attempted only once.
 - (iii) Program 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

When a class is derived from more than one base class it is known as inheritance.

- Multiple
- Multilevel
- Single
- Hierarchical

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

The data structure in which the last node contains the address of the first node is

- Linear linked list
- Doubly linked list
- Circular linked list
- Stack

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

..... function returns the current position of put pointer.

- tellg()
- seekp()
- tellp()
- seekp()

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

The dual of the boolean expression $A.(B + C).1$ is

- $A.(B + C).0$
- $A.BC.1$
- $A + BC + 1$
- $A + BC + 0$

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

..... protocol governs the transfer files over the network.

- HTTP
- Telnet
- SMTP
- FTP

13. Determine the output of the following :

2

```
#include <iostream.h>

int a = 25;

void trial (int &x, int z = 10)
{
    x% = z;
    z+ = 5;
}

void main ()
{
    int a = 15, b = 12;
    trial (a, b);
    cout << :: a <<" "<<b << endl;
    trial (b, :: a);
    cout << :: a+2 <<" "<< b*3 << endl;
}
```

14. Write an user defined function display() which accepts N (number of lines) as its argument, and generates the following pattern for N lines : 2

e.g., If N = 5 :

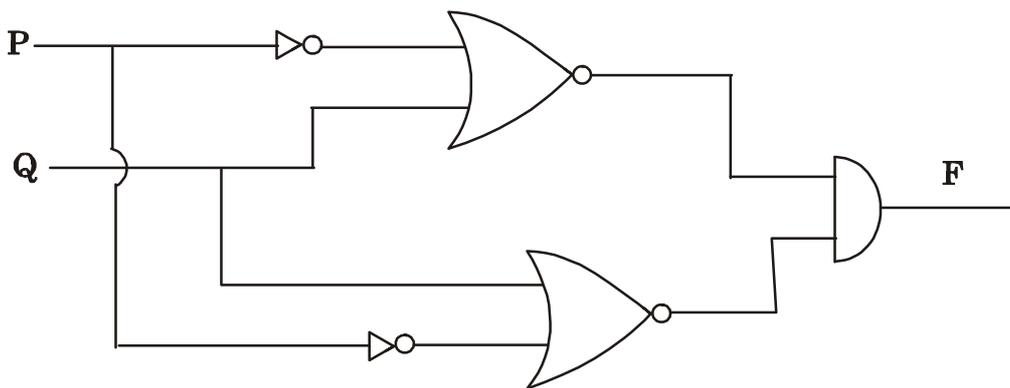
```
15  14  13  12  11
10  9   8   7
6   5   4
3   2
1
```

15. Consider the following sequence of characters 'A', 'B', 'C', 'D' in a queue where 'A' is in the front. Queue is emptied and the contents are pushed on the stack. Determine the order of characters when stack is emptied. 2
16. Consider a text file "Report.txt" exist containing integer numbers. Write a program to find and display the largest number on the screen. Assume that file contain one integer number on each line. 2
17. With reference to the following statements for file handling in C++ answer the questions (i) to (iv) : 2

`fstream obj;`

`obj.open ("sample.txt", ios :: out, ios :: app)`

- (i) State the purpose of the `ios :: app` mode.
- (ii) State the position of the get pointer.
- (iii) State the position of the put pointer.
- (iv) Write the statement to move the position of the get pointer 10 bytes forward from the current position.
18. Write an equivalent Boolean expression F for the following logic circuit. Also draw the truth table for the derived expression F. 2



19. Prove the following DeMorgan's law algebraically : 2

$$(X + Y)' = X'Y'$$

20. Write a short note on packet switching. 2
21. Write two points of difference between star topology and ring topology. 2

Section C

22. Consider the following program : 3

```

#include <iostream.h>
int fact (int);
int main()
{
    int num;

    cout <<“Enter the number” << endl;

    cin >> num;

    .....
    .....          // missing code
    .....

}

```

Write an user defined function fact() which accepts integer digit as parameter and returns its factorial. Further write only the missing code to check whether the sum of factorial of each digit of the number is equal to the original number itself. If sum is equal to original number, display “special number” else “not a special number”.

e.g. : If num = 145

1 ! = 1

4 ! = 24

5 ! = 120

Sum = 120 + 24 + 1

= 145

OR

Write an user defined function process(), which accepts positive integer number N, as parameter. It determines and returns the summation of the following series.

$$\frac{(12)}{\downarrow} + \frac{(12+22)}{\downarrow} + \frac{(12+22+32)}{\downarrow} + \dots\dots\dots N \text{ terms}$$

First term Second term Third term

23. Define a class “Library” in C++ with the following specifications : 3

Data members :

- Private :**
- code — type integer
 - name — character array of size 20
 - game_name — character array of size 20
 - mtype — type character (P for permanent member and T for temporary member)
 - fees — type float

Member functions :

- Public :**
- A parameterised constructor to assign the values for data members code, name, game_name and mtype.
 - Calculate()-to calculate fees according to the following criteria.
Fees for different games.

Game-name	Fees for Permanent Member
Cricket	1000
Tennis	2000
Badminton	3000

If the member is temporary then the fees is double of permanent member.

- Display()-to display all the data members on the screen.
Write a function main() to call necessary functions.

24. Write an user defined function named `common()` which accepts two single dimensional arrays `A[]` and `B[]` and their size m and n resp. as parameters. It determines the type integer and displays the intersection of the two arrays. 3

e.g., If `A[] = {3, 5, 8, 1, 6, 3, 2}`

`B[] = {5, 8, 1, 10, 6, 2, 11, 20}`

The function `common()` should display the following output : 5, 8, 1, 6, 2.

25. Consider the following class declaration : 3

```
class Laptop
```

```
{
```

```
    long Modelno;
```

```
    float RAM, HDD;
```

```
    char Details [120];
```

```
    public : void stockenter()
```

```
    {
```

```
        cin >> Modelno >> RAM >> HDD;
```

```
        gets (Details);
```

```
    }
```

```
    void stockdisplay()
```

```
    { cout << Modelno << RAM << HDD << Details << endl;}
```

```
    long Return Modelno()
```

```
    { return Modelno; }
```

```
};
```

Assume that the binary file “Laptop.dat” contains objects of the above class type. Write an user defined function `search()` which accepts `Modelno` from the user and copies the details of the laptop with accepted `Modelno` to another new file “shift.dat”.

26. Obtain the simplified SOP expression for the following boolean expression using k-map : 3

$$f(p, q, r, s) = \pi(0, 1, 2, 4, 5, 6, 8, 10)$$

Also draw the logic circuit diagram for the simplified SOP expression using NAND gates only.

Section D

27. Declare an abstract class “Art” consisting of the following members : 4

Private :

- Artid-type integer

protected :

- display1()-A function to return Artid

Declare an abstract class “Painters” consisting of the following members :

Private : • Painterid-type integer

protected :

- display2()-A function to return painterid.

Derive a class “Gallery” from the above mentioned classes both in private mode. It consists of the following members.

Private :

- Gname_character array size 20

public :

- display3()-to display all data members on the screen

Define parameterized constructors in all the above three classes. Write function main() to create an object and pass the values as parameters. It displays all the data members of all classes on the screen.

OR

Declare an abstract class “student” which has the following members :

Private :

- Sid-type integer

Protected : Display()-A function to display sid.

Public :

- A constructor function to only initialize data member sid.

Derive a class named “Tutor” under public mode which has the following members.

Private :

- Deposit-type float
- Total-bal-type float
- Fees-Type float

Protected :

- Display()-A function to display Deposit, Fees and Total_bal.

Public :

- A constructor function to initialize Deposit and fees and calculate Total as $Total = Fees - Deposit$.

Derive a class named “Person” from class “Tutor” under public mode which has the following members.

Private :

- Name-character array size 30

Protected :

- Display()-A function to display Name

Public :

- A constructor function to initialize data member Name.

Write a function main() to create an object of class person to initialize data members of all classes and display all data members of all classes on the screen.

28. Consider the following class declaration :

4

```
class stack
{
    struct node
    {
        char a;
        node *link;
    } *top;
public : char *S;
    stack()
    { S = new char;
        top = NULL;
    }
    void push();
    void pop();
    void reverse();
};
```

Define member function.

- (i) push()-to insert a character onto the stack
- (ii) pop()-to pop and display the character from the stack
- (iii) reverse()-to accept a string from the user and insert each character from beginning of the string on the stack.

OR

Consider the following class declaration :

```
class queue
{
    struct node
    {
        int data;
        node *link;
    }*rear, *front;
    public : queue()
        {
            rear = front = NULL;
        }
        void insertion();
        void deletion();
};
```

Write the function definition for :

- (i) insertion()-to insert a node in a queue
- (ii) deletion()-to delete a node in a queue.