



2018 III 21

1000

Seat No. :

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Time : 2½ Hours

COMPUTER SCIENCE (New Pattern)

Subject Code

H	7	0	5
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Total No. of Questions : 28

(Printed Pages : 11)

Maximum Marks : 55

- INSTRUCTIONS:**
- All questions are **compulsory**, however there is an internal choice for question number **22, 27 and 28**.*
 - Question number from **1 to 5** should be attempted **once**.*
 - Programs should be written in **C++ only**.*
 - 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 :

The act of representing essential features without including the background details or explanations is _____.

[1]

- Data abstraction
- Data encapsulation
- Inheritance
- Polymorphism

2. Write the correct alternative from those given below :

[1]

Stack is also called as _____ data structure.

- Last in last out
- First in first out
- Last in first out
- First in last out



3. Write the correct alternative from those given below : [1]
Which stream class is used to perform reading and writing on files ?
- ofstream
 - fstream
 - ifstream
 - iostream
4. Write the correct alternative from those given below : [1]
On application of the de-Morgan's law to the expression \overline{ABC} we get _____
- $\overline{A+B+C}$
 - $\overline{A}+\overline{B}+\overline{C}$
 - $\overline{\overline{A}+\overline{B}+\overline{C}}$
 - $A + B + C$
5. Write the correct alternative from those given below : [1]
A school plans to connect it's department buildings within its campus.
Which communication channel is best suited for high speed connectivity ?
- Optical fibre cable
 - Co-axial cable
 - Twisted pair cable
 - USB cable
6. Define multiple inheritance. [1]
7. State the pre-requisite condition for binary search to perform. [1]
8. The initial configuration of a queue is A, B, C, D (A is at the front end). To get the configuration (D, C, B, A). How many addition and deletion operations do we need ? [1]
9. Define FTP protocol. [1]
10. Define repeater. [1]



SECTION – B

11. Determine the output of the following C++ code.

[2]

```
#include <iostream.h>
int main ()
{
    int a = 10, count = 0;
    while (++a<15)
    {
        cout <<a<<"\t";
        count ++;
        a++;
    }
    cout <<a<<"\t"<<count;
}
```

12. List any two features of object oriented programming.

[2]

13. Determine the output of the following C++ program.

[2]

```
#include <iostream.h>
class person
{
    int roll no;
    int age;
public :
    person (int p = 2)
    {
        roll no = p;
        age = 20;
    }
    person (person &x)
    {
        roll no = x.roll no;
        age = x.age;
    }
}
```



```
    }  
    void view ()  
    {  
        cout<< roll no <<" : "<<age<<endl;  
    }  
};  
int main ()  
{  
    person a, b (5), c(b);  
    a.view ()  
    c.view ();  
}
```

14. Write a user defined function pattern () which accepts a positive integer 'n' as parameter and generates the following pattern for n lines. [2]

```
if n = 4      1  
              2 1  
              3 2 1  
              4 3 2 1
```

15. State two points of difference between linked list and arrays. [2]

16. Consider the following program. [2]

```
# include <fstream.h>  
#include<iostream.h>  
class worker  
{  
    int wno;  
    char wname [20];  
    public :  
    _____  
    _____  
};
```



```
int main ()
{
    worker 2;
    fstream file;
    file.open ("worker.dat", ios :: binary/ios :: in);
    _____// statement 1.
    int bytes = _____// statement 2.
    int count = bytes/sizeof (2).
    cout <<"the number of records are " <<count;
}
```

Complete statement 1 and statement 2 to determine the total number of records present in file worker.dat.

- 17. Consider a text file named numbers.txt consisting of positive natural numbers into it. Write a program that reads numbers.txt and write all even numbers to the text file even numbers.txt. (Assume that the file contains one integer number on each line). [2]
- 18. Draw the truth table for half adder. Write the expression for sum and carry of half adder. [2]
- 19. Given the truth table of a function F(X, Y, Z). Write the S.O.P. form and P.O.S. form (canonical) from the following truth table. [2]

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

- 20. Write a short note on circuit switching technique. [2]
- 21. State two points of difference between bus topology and star topology. [2]



SECTION – C

22. Consider the following program.

[3]

```
# include <iostream.h>
int check_amicable (int);
int main ()
{
    int first, second;
    cout <<“Enter the first number”<<endl;
    cin>> first;
    cout <<“Enter the second number” <<endl;
    cin>> second;
    _____//MISSING
    _____//CODE
    _____
}
```

Write a user defined function

Check_amicable which accepts a positive integer number and returns the sum of the factors of the numbers excluding the number itself.

Further write only the missing code to check if the numbers entered are amicable numbers or not.

(Amicable numbers are two positive numbers so related that the sum of the factors of the first number excluding the number itself is equal to the second number and the sum of factors of the second number excluding the number itself is equal to the first number.)

Eg : 220 and 284 are amicable numbers.

The factors of 220 are 1, 2, 4, 5, 10, 11, 20, 22, 44, 55 and 110 which equals 284.

The factors of 284 are 1, 2, 4, 71 and 142 which equals 220.

OR



Consider the following program.

```
# include <iostream.h>
int check_emirp(int);
int main ()
{
    int reverse (int);// the function determines the reversal of the argument
    int num;r;
    cout <<"enter a number";
    cin>> num; r=reverse (num);
    _____ MISSING
    _____ CODE
    _____
}
```

Write a user defined function

check_emirp which accepts a positive integer number and returns 1 if the number is prime and 0 if the number is composite.

Further write only the missing code to determine whether the number entered is an emirp number or not.

(An emirp number is a prime number whose reversal is also a prime number)

Eg : 13 is an emirp number.

13 is a prime number

31 is also a prime number.

23. Define a class named convert with the following specifications.

[3]

- feet of type integer
- inch of type integer
- define a default constructor which accepts values for all the data members.
- define a copy constructor which accepts two objects as parameters and initialises data members as per the summation of quantities of both the objects. (Refer example below)
- define member function view () to display values of data members of all the objects.



Further write appropriate main function.

Example : if obj 1 is 3 ft 4 inches
 obj 2 is 5 ft 9 inches
 obj 3 is 9 ft 1 inches.

24. Explain the concept of converting infix expression to postfix expression in a tabular form with the following expression. [3]

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

25. Given a binary file club.dat containing records of the following type. [3]

Class club

```
{  
    int mno;  
    char mname [20];  
    char member_type [15];  
    public :  
    void register ();  
    void display ();  
    int check (char s[ ] )  
    {  
        return strcmp (member_type,s);  
    }  
};
```

Write a function split () in C++ that would copy all those records which are having member_type as “Life” to binary file lifemembers.dat else copy the records to temporary.dat.

26. Obtain a simplified S.O.P. form for the Boolean expression using K-map. [3]

$f(U, V, W, Z) = \sum (0, 1, 3, 4, 5, 7, 9, 10, 11, 13, 15)$

Also draw the logic circuit diagram for the simplified expression using basic gates.



SECTION – D

27. Declare an abstract class named employee with the following members. [4]

- 1) empid-of type integer under private visibility label.
- 2) constructor to only initialise data member empid.
- 3) display () – a function under protected visibility label to display the data member empid.

Declare an abstract class named income with the following members.

- 1) salary of type float under private visibility label.
- 2) constructor to only initialise data member salary.
- 3) display () – a function under protected visibility label to display the data member salary.

Declare a class named office with the following members.

- 1) name – a character array of size 30 under private visibility label.
- 2) x of type employee under private visibility label.
- 3) y of type income under private visibility label.
- 4) constructor to only initialise data member name.
- 5) display () – a function under public visibility label to display the data member name.

Write a main function to accept the input values and display the data members of all the classes.

OR

Declare an abstract class named regularedu with the following members.

- 1) schoolcode of type integer under private visibility label.
- 2) parameterized constructor to only initialise data member schoolcode.
- 3) display () – a function under protected visibility label to display the data member schoolcode.



Declare an abstract class named `distanceedu` with the following members :

- 1) Study centerid of type integer under private visibility label.
- 2) Parameterized constructor to only initialise data member study centerid.
- 3) Display () – a function under protected visibility label to display the data member studycenterid.

Derive a class `course` from class `regularedu` and `distanceedu` both in public mode.

The class has the following members.

- 1) Course code of type integer under private visibility label.
- 2) A parameterized constructor to only initialise the data members.
- 3) Display () – a function under public visibility to display the data members.

Write a main function to accept input values and display data members of all the classes.

28. Consider the following class declaration.

[4]

Class list

```
{
    struct node
    {
        int data;
        node * next;
    } * first;
    public :
    list ()
    {
        first = NULL;
    }
    void create ();
    void view ();
};
```

Write the function definitions for the following.

- 1) create () – to create a list of n nodes.
- 2) view () – to display only those nodes whose data is greater than 100.

OR



Consider the following class declaration.

[4]

Class list

```
{
    struct node
    {
        int data;
        node * next;
    } * first;
    public :
    list ()
    {
        first = NULL;
    }
    void del ();
    void search ();
};
```

Write the function definitions for the following.

- 1) del () – to delete a node present at position pos from the linked list containing n nodes.
- 2) search () – to search for a particular element in the linked list.
