

2016

COMPUTER SCIENCE

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three Hours and *Fifteen Minutes

*(*15 minutes are given as extra time for reading questions)*

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

Select the correct answers from each of the following (1-4) and rewrite it.

1×4=4

1. When a derived class inherits from a class which itself inherits from another class, it is known as
 - (a) Multiple Inheritance
 - (b) Multilevel Inheritance
 - (c) Hybrid Inheritance
 - (d) Heirarchical Inheritance.

2. Which of the following is *not true* in a destructor ?
- (a) Destructor functions are invoked automatically when objects are destroyed.
 - (b) A destructor cannot be inherited.
 - (c) A destructor may not be static.
 - (d) Arguments can be provided to a destructor.
3. Every non-key attribute is fully dependent on each candidate key of the relation, then the relation is said
- (a) First Normal Form (1NF)
 - (b) Second Normal Form (2NF)
 - (c) Third Normal Form (3NF)
 - (d) None of the above.
4. The device used to communicate between dissimilar networks with different protocols is
- (a) Repeater
 - (b) Bridge
 - (c) Gateway
 - (d) Router

Give very short answers to the following questions (5-14) : 1×10=10

- 5. How a structure is different from an array in C++ ?
- 6. What is the benefit of using inline function ?
- 7. What is the need for inheritance ?
- 8. When a pointer is said to be a Null pointer ?

9. Why a stack is said to be in a condition of overflow ?
10. Define a linked list.
11. What is the drawback of bubble sort algorithm ?
12. Write the dual of $(A+B) (AB+c')$
13. State De Morgan's theorems.
14. Mention *one* advantage of using optical fibre.

Give short answers to the following questions (15-24) : 2×10=20

15. Write *one* point of difference between
 - (i) while and do-while loop
 - (ii) break and continue statement.
16. What do you mean by abstraction and encapsulation ?
17. What is the role of visibility mode in a derived class ?
18. Differentiate between the functions read () and get ().
19. What is self referential structure ? Give an example.
20. Evaluate the following postfix notation of expression :
3, 2, +, 4, *, 8, —
21. Write *two* uses of DBMS.
22. Minimize the boolean expression to the minimum number of literals
 $AB+BC+A'C$

23. Draw a circuit diagram to realize the following expression :

$$F(X,Y,Z) = XY' + X'YZ'$$

24. Minimize the expression $F(W,X,Y,Z) = S(0,4,8,12)$ using K-map.

Give answers to the following questions (25-31) :

3×7=21

25. How is modular programming approach different from procedural programming approach ? What is the purpose of an ADT ?

26. Consider the following code

```
Class X
{
    int a ;
    protected :
        int b, c ;
    public :
        void input ( ) ;
        void show ( ) ;
};
Class Y : protected X
{
    int d, e ;
    protected :
        int f ;
        void get (int, int) ;
    public
        void display ( ) ;
};
Class Z : public Y
{
    int g ;
    void in ( ) ;
    public :
        void out ( ) ;
};
```


- (i) Name base class and derived class of class Y.
- (ii) Name the data members that can be accessed from the function out ()
- (iii) Name the private member functions of the class Z.
27. Write a C++ program to exchange the contents of two variables by using pointers.
28. Write an algorithm to find the maximum and minimum values of numbers stored in a two dimensional array.
29. What is the major drawback of a linear queue ? How it can be removed ?
30. How data can be transmitted in the following three modes of transmission
- (i) Simplex Transmission
- (ii) Half-Duplex Transmission
- (iii) Full-Duplex Transmission.
31. What are the advantages of E-mail over ordinary postal system ?

Give answers to the following questions (32-34) :

5×3=15

32. Write a C++ program to sum of each row and column of a matrix.
33. Write a C++ program to search an item from a list of items using binary search method.
34. (a) What are the basic file operations ?
- (b) What is the difference between tuple and attribute ?
- (c) Consider a table STUDENT having the fields SL. No., Name, Age, Department, Fee and Sex. Write the SQL command :
- (i) To show information about the students of the COMPUTER department.
- (ii) To count the number of students with age < 20.
- (iii) To display name, age and fee of all male students.