

2017

**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. In C++, the keyword typed of belongs to 1
- (a) Primary data type
  - (b) Derived data type
  - (c) User-defined data type
  - (d) Enumerated data type

2. If no visibility mode is specified then the class will inherit 1
- (a) privately
  - (b) publicly
  - (c) protectedly
  - (d) both (a) and (b)
3. Which of the following file is called the detail file ? 1
- (a) Indexed file
  - (b) Master file
  - (c) Transaction file
  - (d) None of the above
4. The layer which ensures that data from the source arrives at the destination correctly and in proper sequence is 1
- (a) Physical layer
  - (b) Data Link layer
  - (c) Network layer
  - (d) Transport layer

*Give very short answers to the following questions (5-14) :*

5. Define a Class. 1
6. What is the main difference between default constructor and parameterized constructor ? 1

7. When virtual base class are used in inheritance ? 1
8. How a file "MAIN.DAT" can be opened in the output mode for writing on for using the constructor of the stream class ? 1
9. What operations are possible on a stack ? 1
10. Differentiate between infix expression and postfix expression. 1
11. Name the *two* fields of a node in a linked list. 1
12. Which gates are called Universal gates ? 1
13. Write the use of Decoder. 1
14. What is Cyber crime ? 1

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

15. Which loop is called a count-controlled loop in C++ ? How does a structure differ from an array ?
16. Define a polymorphism. What is a way of achieving polymorphism in C++ ?
17. Why it is necessary to have a destructor for a class ?
18. What is the difference between `ios::ate` and `ios::app` file mode ?
19. Name the operator in order to request dynamic memory. What is this pointer ?

20. An array X [10] [20] is stored in memory with each element requiring 2 bytes of storage. If the base address of the array is 1000. Calculate the location of X [3] [8] when the array X is stored using column major order.

21. What is the need for normalization ?

22. Using truth tables verify that

$$XY \cdot (X + Y) = X \cdot Y$$

23. Draw the circuit diagram for full adder.

24. Prove  $X + X'Y = X + Y$  algebraically.

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

3×7=21

25. What are the major advantages of OOP ?

26. Define inheritance. Draw the form of Hierarchical inheritance and Hybrid inheritance.

27. Write a C++ program to print the different characters of a string "MANIPUR" on different lines using pointers and also count the total number of characters.

28. Write the sequence of steps required to sort an array of elements in ascending order given below with the help of bubble sort.

56    23    45    30    12

29. Write an algorithm for Linked List Traversal.

30. Explain the *three* types of networks.

31. Define the following Internet related terminology :

- (a) www
- (b) Website
- (c) Web browser.

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

5×3=15

32. Write a C++ program to find the sum of the following series

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

33. Write a C++ program to merge two sorted arrays in a single array.

34. (a) Define a data model. What are the types of data model ?
- (b) Why DISTINCT clause is used with SELECT command ?
- (c) Write the SQL command to create the student table containing fields, rollno, student name, sex and fee.