M 8256

Reg. No. : .....

Name : .....

**VI Semester B.A./B.Sc./B.Com./B.B.A./B.B.A.T.T.M./B.B.M./B.C.A./B.S.W./ B.A. Afsal-Ul-Ulama Degree (CCSS – Reg./Supple./Improv.) Examination, May 2015**

**OPEN COURSE**

**6D02 MAT : Principles of Computer Science**

Time : 2 Hours Max. Weightage : 20

PART – A

I. Fill in the blanks :

1) The collection of a field values of a given entity is called a _____

2) A data structure which contain a hierarchical relationship between various elements is _____

3) The data structure operation which combine the records in two different sorted files into a single sorted file is known as _____

4) In queue data structure, the deletions can take place only at one end called _____ **(Weightage 1)**

II. Fill in the blanks :

5) Data elements of a linked list are called _____

6) The situation where new data are to be inserted into a data structure but there is no available space is called _____

7) The header list where the last node points back to the header node is called a _____

8) Example for a linked list operation is _____ **(Weightage 1)**

P.T.O.

## PART – B

Answer **any six** from the following : **(Weightage 1 each)**

9. A professor keeps a class list containing the following data for each student : Name, Major, Student number, Test scores, Final grade. Describe the field values, records and file.

10. What do you mean by an array ?

11. Explain the term binary search. What is the complexity of binary search ?

12. What do you mean by the worst case complexity of an algorithm ? What is the worst case complexity of linear search algorithm ?

13. Distinguish between function subalgorithms and procedure subalgorithms.

14. Write a note on different types of linked lists.

15. What do you mean by overflow in a linked list ?

16. What do you mean by list of available space in memory ?

17. Let LIST be a linked list in memory. Write a procedure which finds a number NUM of nonzero elements in LIST.

18. Discuss the advantages of a two-way list over a one-way list for searching a sorted list for a given ITEM. **(Weightage 6×1=6)**

## PART – C

Answer **any four** from the following : **(Weightage 2 each)**

19. List and explain different data structures.

20. Briefly describe the notions of the complexity of an algorithm and the space-time tradeoff of algorithms.

21. Suppose that $T_1(n)$ and $T_2(n)$ are the time complexities of two program fragments $P_1$ and $P_2$ where $T_1(n) = O(f(n))$ and $T_2(n) = O(g(n))$. What is the time complexity of program fragment $P_1$ followed by $P_2$ ?

22. Write an algorithm to find the largest element in an array.

23. Write a procedure to print the information at each node of a linked list.

24. Write a note on garbage collection in linked list.

25. Write an algorithm to traverse a circular header list.

26. Write an algorithm to find the location LOC of the node where ITEM first appears in a sorted LIST. **(Weightage 4×2=8)**

## PART – D

Answer **any one** from the following : **(Weightage 4 each)**

27. Explain control structures with details.

28. Briefly describe different components which are used to present algorithms.

29. Write an algorithm which deletes the last node from a list. **(Weightage 1×4=4)**