Roll No. .....

Total Pages : 03

GSM/D-24

1063

DATA STRUCTURES

BCA-232

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Question No. 1 is compulsory. In addition to the mandatory question, attempt *four* more questions, selecting exactly *one* question from each Unit. All questions carry equal marks.

(Compulsory Question)

1. (a) Differentiate between field, record, and file.

   (b) What do you mean by pattern matching ? Provide an example.

   (c) What do you understand by an array ?

   (d) How can you traverse a single linked list ?

   (e) What is meant by stack ?

   (f) State any *two* applications of the queue.

   (g) Define Binary tree.

   (h) How can you represent a graph using a linked list ? **8×2=16**

Unit I

2. (a) What is meant by the complexity of an algorithm ? How can you find the complexity of an algorithm ? Explain using a suitable example. 8

(b) Differentiate between data types and data structures. 8

3. Explain the procedure of storing strings in computer memory. Also, write an algorithm to match a pattern from a given text. 16

Unit II

4. (a) What is a sparse matrix ? Discuss various ways to store sparse matrices in computer memory. 8

(b) Write an algorithm to Insert an element after a given node in a one-way linked list. 8

5. Explain various types of arrays along with their representation in computer memory. Write the algorithm for multiplying two matrices. 16

Unit III

6. Explain the memory representations of queues using both arrays and linked lists. Also, write the algorithm for insertion in a queue using both techniques. 16

7. Write down the algorithms for converting an infix expression into a postfix expression and evaluate the postfix expression. 16

Unit IV

8. Write an algorithm for traversing a tree using preorder traversal. Also, explain the same with the help of a suitable example. 16

9. What do you understand by Multi-graph and Directed graphs ? Explain the sequential memory representation of graphs and write an algorithm to read and write a graph using this representation. 16