[Total No. of Questions - 9] [Total No. of Printed Pages - 2]
(2068)

18038(J)

**B. Tech 3rd Semester Examination**

**Data Structures (CBS)**

**CS-301**

**Time : 3 Hours** **Max. Marks : 60**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Candidates required to attempt five questions in all selecting one question from each of sections A, B, C & D and all the subparts of the questions in Section E.

## SECTION - A

1. Define the term 'Algorithm'. Establish a relation between the terms, algorithms and data structure. How an algorithms plays a vital role in any of the data structure. Support your answer with adequate example in C. (10)

2. What is the intent of arrays concept in data structure? Classify them and describe in detail the purpose of different types of arrays in the aforesaid domain. Explain with lucid example in C. (10)

## SECTION - B

3. Manifest the role of the terms, allocation and garbage collection in linked list. How these terms are associated with the particular application in data structure. Explain with suitable example in C. (10)

4. Enumerate and describe the rules for representation of queues in memory. Also, explain the use of priority queues in the above said domain. Answer with appropriate example in C. (10)





## SECTION - C

5. List and describe major strategies for implementing binary tree in the data structure. Which strategy you will prefer as compared to others in the above said context. Justify with pertinent example in C. (10)

6. Describe the following tactics: Heap Tree, B-tree and Minimum Spanning Tree. How these tactics help in the designing of efficient data structure. Answer with canonical example in C. (10)

## SECTION - D

7. Explain the need of searching and sorting in data structure. Explain with example in C language to implement Quick Sort algorithm. (10)

8. What factors you will consider while designing a hash table for a particular data structure? Explain in details, the desirable properties for a good hash table to avoid collision in the aforesaid domain. Answer with an adequate example. (10)

## SECTION - E

9. (a) Describe the use of asymptotic notations in data structure. Answer with example.

   (b) Reason out the need of graphs in data structure with example.

   (c) What are the double ended queues?

   (d) Discuss the function of minimum spanning tree?

   (e) Explain in brief, how bubble sort works. (5×4=20)