GITAM (Deemed to be University)
[CSEN3151]
GST/GSS/GSB/GSHS Degree Examination

IV Semester

ADVANCED DATA STRUCTURES
(Effective from the admitted batch 2021-22)

Time: 2 Hours   **Max. Marks: 30**

Instructions: All parts of the unit must be answered in one place only.

Section-A

1. **Answer all questions:**   **(5×1=5)**

   a) Provide an example of a real-world scenario where a Priority Queue would be useful.

   b) Explain the key characteristics of a good hash function.

   c) Describe the rotation operation used in AVL trees to maintain balance.

   d) List few applications of Prim's algorithm.

   e) Name one key advantage of the Boyer-Moore algorithm over other string searching algorithms.

Section-B

Answer the following: **(5×5=25)**

UNIT-I

2. Develop a recursive function to generate the Fibonacci number up to n^{th} terms.

OR

3. How to perform Sorting with Priority Queue? Explain with example.

UNIT-II

4. Compare and contrast separate chaining and open addressing as collision resolution techniques. Discuss their advantages and disadvantages.

OR

5. What do you mean by rehashing the hash function? Explain its role in addressing collisions.

UNIT-III

6. What are the primary operations in a Splay Tree, known as "splaying," and its significance? Provide a step-by-step illustration of the splaying process and its effects on the tree structure.

OR

7. Describe the process of inserting a new key into a B-Tree of order m. Explain how the tree is modified to maintain its balance and adherence to B-Tree properties. Discuss the conditions under which node splitting and merging occur during insertion.

UNIT-IV

8. Explain the Prim's algorithm for finding the minimum spanning tree (MST) of a weighted undirected graph with an example.

OR

9. Explain the concept of external sorting and discuss why it is necessary for handling large datasets that do not fit into main memory. Describe the key challenges involved in external sorting and how they differ from those in internal sorting algorithms.

UNIT-V

10. Describe the Brute Force algorithm for pattern matching in strings. Explain the step-by-step process of how the algorithm searches for a given pattern within a text.

OR

11. Explain the concept of a trie data structure and its purpose in storing and searching for strings. Describe the structure of a trie and how it differs from other tree-based data structures such as binary search trees and balanced trees.