



R22 Regulation

Subject code: E251PC2

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A+' Grade)

**M.TECH I Semester Regular/Supplementary Examinations, March 2025**

**ADVANCED DATA STRUCTURES  
(COMPUTER SCIENCE AND ENGINEERING)**

Maximum Marks: 60

Date: 12.03.2025

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A			CO	Bloom Tx level
All the following questions carry equal marks (10x1M=10 Marks)				
1a)	How does a heap differ from a binary search tree		1	L2
b)	What are the advantages of Fibonacci Heaps		1	L1
c)	List the good features of hash function		3	L1
d)	What is the primary advantage of using a hash table over an array or linked list?		3	L1
e)	In an AVL tree, at what condition the balancing is to be done?		3	L3
f)	What is an Optimal Binary Search Tree (OBST), and why is it used?		3	L3
g)	How tries differ from hash tables?		3	L2
h)	What is the key difference between a Binary Trie and a Patricia Trie?		3	L2
i)	Which heuristic does Horspool use for string matching?		2	L3
j)	What are the two main types of string matching algorithms?		2	L1
Part-B			CO	Bloom Tx level
Answer All the following questions. (5X10M=50Marks)				
2	a	Define binomial heap. Explain the structure and representation of binomial heap with suitable diagrams. (5M)	1	L2
	b	The elements 32, 15, 20, 30, 12, 25 and 16 are inserted one by one in the given order into a Max-heap. What is the resultant Max-heap? (5M)	1	L3
OR				
3	a	Compare Fibonacci Heaps and Binomial Heaps (5M)	1	L4
	b	Construct a heap using the following list of numbers: 12,9,8,3,7,5,10,18 (5M)	1	L3
4	a	How do you represent Hash Table? Explain (5M)	3	L2
	b	Distinguish the importance of Double Hashing with example. (5M)	3	L2
OR				
5	a	What is collision? Explain different collision resolution methods. (5M)	3	L2

	b	Apply Following elements 76, 40, 48, 05, 55 to inserted into an empty hash table with hash function $f(x) = x \% 7$ for quadratic probing. (5M)	3	L3
6	a	Construct an AVL tree with values 42, 34, 75, 23, 21, 18, 90, 67, 78 into an initially empty tree. (5M)	3	L3
	b	Draw B-tree of order $m=5$ for the keys {K,O,S,V,M,F,B,G,T,U,W } (5M)	3	L3
OR				
7	a	What is a red-Black tree? Mention the properties that a Red-Black tree holds. (5M)	3	L2
	b	What are splay trees are used for? Describe the splaying operations with examples (5M)	3	L2
8	a	List the advantages and disadvantages of Tries (5M)	3	L2
	b	What is a binary trie? Construct a binary trie with elements: 0001, 0011, 1000, 1001, 1100, 0010, 1101, 1010. (5M)	3	L3
OR				
9	a	Define and explain the concepts of digital search trees. (5M)	3	L2
	b	What is the major difference between a Compressed Trie and a Patricia Trie? In what scenarios is a Compressed Trie more useful than a Standard Trie? (5M)	3	L3
10	a	Give a brief description on pattern matching problem and explain Boyer-moor algorithm with an example (5M)	2	L2
	b	Explain working principal of Knuth Morris Pratt algorithm with example (5M)	2	L2
OR				
11	a	Which pattern matching algorithm avoids the repeated comparison of characters? Discuss with suitable example (5M)	2	L2
	b	How does Rabin-Karp use hashing for pattern matching? (5M)	2	L2