*R22 Regulation* *Subject code:4E2AQ*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech II Semester Supplementary Examinations, June 2026

## DATA STRUCTURES

*(Common to CSE & CSE(AI&ML))*

***Maximum Marks: 60*** Date: 22.06.2026 Duration: 3 hours

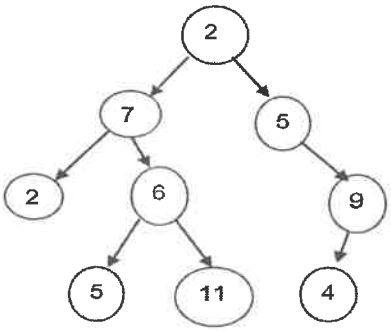
**Note: 1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

| All the following questions carry equal marks (10X1M=10 Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1.a | Define Algorithm. | 1M | CO1 | L1 |
| b | Distinguish between linear and nonlinear data structure. | 1M | CO1 | L1 |
| c | State different types of linked list? | 1M | CO2 | L1 |
| d | List any two applications of stack. | 1M | CO2 | L1 |
| e | What is Binary Tree? | 1M | CO3 | L1 |
| f | Define height of a binary tree. | 1M | CO3 | L1 |
| g | What do you mean by internal sorting? | 1M | CO4 | L1 |
| h | List the uses of hash table? | 1M | CO4 | L1 |
| i | Write the properties of B- Trees? | 1M | CO5 | L1 |
| j | List the different AVL tree rotations to insert a node? | 1M | CO5 | L1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 2 | Explain asymptotic notations with an example. | 10M | CO1 | L2 |
| | OR | | | |
| 3 | a) Explain time and space complexity with examples.<br>b) Explain in detail about linear and non-linear data structure. | 5M<br>5M | CO1<br>CO1 | L2<br>L2 |
| 4 | Evaluate the following expression A+(B*C)-((D*E+F)/G) into postfix form. | 10M | CO2 | L3 |
| | OR | | | |
| 5 | Explain singly linked list with suitable example program. | 10M | CO2 | L3 |
| 6 | Explain binary tree traversals and write in order, preorder and post order traversal for the following tree | 10M | CO3 | L3 |

| | | | | |
|---|---|---|---|---|
| |  | | | |
| | OR | | | |
| 7 | a) Explain priority Queue ADT with its operations.<br>b) Explain path compression and smart union algorithm with examples. | 3M<br>7M | CO3 | L3 |
| 8 | Define collision and discuss collision resolution techniques. | 10M | CO4 | L3 |
| | OR | | | |
| 9 | Insert the following list of elements into the hash table by using linear probing (size of hash table is 10) {16,23,43,18,34,59,30,22} and explain. | 10M | CO4 | L3 |
| 10 | Insert the following elements into an empty AVL Tree<br>20,15,5,10,12,17,25,19 | 10M | CO5 | L3 |
| | OR | | | |
| 11 | Define graph. Explain how graphs can be represented in adjacency matrix and adjacency list. | 10M | CO5 | L3 |