*R22 Regulation* *Subject code:4E4EC*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech IV Semester Regular/Supplementary Examinations, June 2026

## DATABASE MANAGEMENT SYSTEMS

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

*Maximum Marks: 60* Date:12.06.2026 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 10 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 | Bloom Tx |
|---|---|---|---|---|
| 1.a) | What are database languages? | 1M | 1 | 1 |
| b) | Distinguish between relationship and relationship set. | 1M | 1 | 2 |
| c) | Discuss how views are different from tables. | 1M | 2 | 2 |
| d) | Define Domain Relational Calculus. | 1M | 2 | 1 |
| e) | Define Trigger. | 1M | 3 | 1 |
| f) | What is decomposition. | 1M | 3 | 2 |
| g) | Explain cascading rollback. | 1M | 4 | 2 |
| h) | State transaction states with diagram. | 1M | 4 | 1 |
| i) | Define Hash-Based Indexing. | 1M | 5 | 1 |
| j) | What is Linear Hashing? | 1M | 5 | 1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 2 | a) What is the three-level architecture? Explain its components with a diagram.<br>b) Describe different types of database users and their roles. | 5M<br>5M | 1 | 2 |
| | OR | | | |
| 3 | a) Explain different types of attributes and how they are represented in ER model.<br>b) Explain specialization and generalization in ER models. | 5M<br>5M | 1 | 2 |
| 4 | a) Explain different types of integrity constraints in the relational model. Why are they important?<br>b) Explain the process of converting an ER diagram into relational schema. | 5M<br>5M | 2 | 2 |
| | OR | | | |
| 5 | a) Explain set operations in Relational algebra with examples.<br>b) Consider Sailors, Reserves, and Boats schema and answer the following using Relational algebra.<br>Sailors( sid: integer, sname: string, rating: integer, age: real) | 5M<br>5M | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| | Boats( bid: integer, bname: string, color: string)<br>Reserves (sid: integer, bid: integer, day: date<br>1. Find the names of sailors who have reserved a 'green' boat.<br>2. Find the colors of boats reserved by sailor 'Rusty'.<br>3. Find the names of sailors who have reserved boat 101. | | | |
| 6 | a) Explain UNION, INTERSECT, and EXCEPT operations with examples.<br>b) Discuss about Group by and Having options in SQL. Answer the following queries using Sailors, Reserves, and Boats database.<br>1. Find the age of the youngest sailor for each rating level.<br>2. Find the average age of sailors for each rating level that has at least two sailors. | 5M<br>5M | 3 | 3 |
| | OR | | | |
| 7 | a) Define normalization. Illustrate three normal forms in detail with an example.<br>b) Explain lossless decomposition with an example. | 5M<br>5M | 3 | 3 |
| 8 | a) Explain ACID properties of Transactions.<br>b) Explain Serializability. Illustrate how precedence graph is used to determine whether a schedule is serializable or not. | 5M<br>5M | 4 | 4 |
| | OR | | | |
| 9 | a) What are the types of Locks? Explain Two-Phase Locking Protocol with example.<br>b) Illustrate how concurrency control is achieved through an example. | 5M<br>5M | 4 | 3 |
| 10 | a) Explain Tree-Based Indexing with example.<br>b) Discuss about Indexed Sequential Access Method with example. | 5M<br>5M | 5 | 2 |
| | OR | | | |
| 11 | a) Explain Insert operations in B+ Tree with 07,17,41,32,28,09,48,25,23,42.<br>b) Explain Extendible Hashing 6,16,26,35,42,61,32,48. | 5M<br>5M | 5 | 3 |