

**BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)**  
**B. Tech. Sem - III Computer Science & Engineering AI & ML : WINTER: 2025**  
**SUBJECT: DATABASE MANAGEMENT SYSTEMS**

Day : Wednesday  
Date : 17/12/2025

W-23939-2025

Time : 10:00 AM-01:00 PM  
Max. Marks : 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non – programmable **CALCULATOR** is allowed.
- 4) Assume suitable data if necessary.

- Q.1** a) What is Weak entity set? Explain with suitable example. (05)  
b) Discuss the different levels of views. (05)

**OR**

Write short notes on the following: (10)

- i) Advantages of DBMS,
- ii) Database models.

- Q.2** A university registrar's office maintains data about the following entities: (10)  
1. courses, including number, title, credits, syllabus, and prerequisites;  
2. course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;  
3. students, including student-id, name, and program;  
4. Instructors, including identification number, name, department, and title.

Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrars.

Documents all assumptions that you make about the mapping constraints.

**OR**

Draw the ER diagram of a Hospital management system and explain. (10)

- Q.3** Write sql syntax for creating table EMP (EMPNO, ENAME, SALARY, JDATE, DIS). (10)  
Write sql syntax for insert two rows in table, delete one row from table, update salary and view whole table.  
What is the different operation performing using DML Explain?

**OR**

Consider the relational database: (10)  
Employee (person-name, street, city)  
Works (person-name, company name, salary)  
Company (company name, city)  
Manages (person-name, manager-name)

Write down appropriate SQL statement for the following queries:

- a) Find the name of all employees who work for 'SBI bank'.
- b) Find name, street address, cities of residence of all employees who work for 'SBI Bank' and earn more than Rs.5,00,000 per annum.
- c) Find the second highest salary for employees in 'SBI bank'.
- d) Find the names of all employees who live in the same city and on the same street as do their manager.
- e) Find the company that has the most employees.

**P.T.O.**

Q.4 a) Find out the closure of attribute set (AD) i.e. (AD)<sup>+</sup> in the R. Set of FD's F are as given below: (05)

$R = \{A, B, C, D, E, J\}$ ,  
 $FD = \{B \rightarrow CD, D \rightarrow E, B \rightarrow A, E \rightarrow C, AD \rightarrow B\}$ .

b) Consider the following two sets of FDs: (05)

$F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$

$G = \{A \rightarrow CD, E \rightarrow AH\}$ .

Check whether they are equivalent. Justify your answer.

OR

a) Consider the relation  $R = \{A, B, C, D, E, F, G, H, I, J\}$  and the set of functional dependencies: (05)

$F = \{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$

Decompose R into 3 NF.

b) Explain with example "BCNF is stricter than 3NF". (05)

Q.5 Explain any 4 Types of Relational operations with example? (10)

OR

a) What is 2-phase locking protocol? How does it guarantee serializability? (05)

b) Explain log-based recovery and checkpoints. (05)

Q.6 Explain architectural model for distributed DBMS? (10)

OR

Draw and Explain Client-Server Architecture? (10)

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