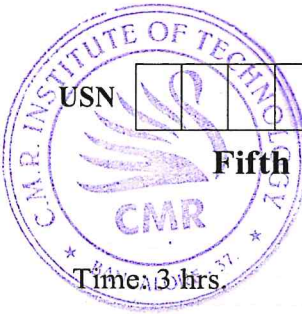


# CBCS SCHEME



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17CS53

## Fifth Semester B.E. Degree Examination, Feb./Mar. 2022 Database Management System

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- Define DBMS. Explain in detail the characteristics of database approach. How does it differ from traditional file system? (10 Marks)
  - What are the functions of Database Administrators (DBA)? (04 Marks)
  - Explain the Three – Schema Architecture, with a neat diagram. (06 Marks)

OR

- Write an E – R diagram for a banking database. Assume your own entries (minimum 5 entities), attributes and relations. Also mention cardinality ratio. (10 Marks)
  - Explain with neat sketch, the different phases of database design. (10 Marks)

### Module-2

- Consider the following schema for a Company database :  
EMPLOYEE (Name , SSN , Address , Sex , Salary, DNo)  
DEPARTMENT (DName , DNumber , MGRSSN , MGRSTARTDATE)  
PROJECT (PName, PNumber, PLocation, DNum)  
WORKS-ON (ESSN, PNo, Hours)  
DEPENDENT (ESSN, DependentName, Sex, BDate, Relationship)  
Write the queries in relational algebra to
    - Retrieve the name and address of all employees who work for the 'Research' department.
    - Find the names of employees who work on all projects controlled by department number 5.
    - List all the projects on which employee 'Smith' is working.
    - Retrieve the names of employees who have no dependents. (10 Marks)
  - What is a Relation? Explain the characteristics of relations. (10 Marks)

OR

- Explain the syntax of SELECT statement. Write the SQL query for the following relational algebra expression  
 $\Pi_{Bdate, Address} (\sigma_{FName = 'John' \text{ AND } LName = 'Smith'} (EMPLOYEE))$ . (06 Marks)
  - With examples, explain aggregate function in SQL. (10 Marks)
  - Explain how the ALTER TABLE command can be used to add and drop constraints. (04 Marks)

### Module-3

- How is a view created and dropped? What are the problems associated with updation of views? (10 Marks)
  - Explain the following :
    - Embedded SQL
    - Database Stored Procedures. (10 Marks)

OR

- 6 a. Explain the various steps in JDBC process by giving examples for each step. (10 Marks)  
 b. What is a Trigger? Explain with an example, how a trigger is created. (10 Marks)

Module-4

- 7 a. What is a Functional Dependency? Write an algorithm to find a minimal cover for a set of functional dependencies. (10 Marks)  
 b. What is the need of Normalization? Explain second normal form. Consider the relation  
 EMP\_PROJ = {SSN, PNumber, Hours, EName, PName, PLocation}  
 Assume {SSN, PNumber} as Primary key.  
 The dependencies are  
 $\{SSN, PNumber\} \rightarrow \{Hours\}$   
 $SSN \rightarrow \{EName\}$   
 $PNumber \rightarrow \{PName, PLocation\}$   
 Normalize the above relation into 2NF. (10 Marks)

OR

- 8 a. Explain Multivalued dependency and fourth normal form, with an example. (10 Marks)  
 b. Consider the relation schema  
 $R = \{A, B, C, D, E\}$ . Suppose the following dependencies hold :  
 $\{E \rightarrow A, CD \rightarrow E, A \rightarrow BC, B \rightarrow D\}$ .  
 State whether the following decomposition of R are lossless join decomposition or not ,  
 Justify.  
 i)  $\{(A, B, C), (A, D, E)\}$       ii)  $\{(A, B, C), (C, D, E)\}$ . (10 Marks)

Module-5

- 9 a. Explain why a transaction execution should be atomic. Explain ACID properties by considering the following transaction :  
 T1 : read (A) ;  
       A := A - 50 ;  
       write (A) ;  
       read (B) ;  
       B := B + 50 ;  
       write (B). (10 Marks)  
 b. Explain the Database Recovery techniques. (10 Marks)

OR

- 10 a. Draw a state diagram and discuss the typical states that a transaction goes through during execution. (10 Marks)  
 b. With an algorithm , explain two phase locking. (10 Marks)

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