

B.TECH
(SEM IV) THEORY EXAMINATION 2017-18
Database Management System

Time: 3 Hours

Total Marks: 70

- Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.
 2. Any special paper specific instruction.

SECTION A

1. **Attempt all questions in brief.** **2 x 7 = 14**
- a. Differentiate between Hierarchical and Network Data Model.
 - b. Explain about Mapping of Binary 1:1 relationship types and Binary M:N relationship types.
 - c. Explain Homogeneous Distributed Database.
 - d. How is Shadow paging different from Data Replication.
 - e. What is the difference between Aborted and Failed state of a Transaction.
 - f. What is a Weak Entity. Give Example..
 - g. Mention the desirable properties of relation decomposition.

SECTION B

2. **Attempt any three of the following:** **7 x 3 = 21**
- a. Compare the database system with conventional file system
 - b. Draw an E-R diagram for a hospital with a set of patients and a set of medical doctors, with each patient a log of the various conducted tests is also associated.
 - c. Discuss the selection, projection and join operator of relational algebra with suitable example.
 - d. What do you mean by decomposition of a relation?
 Consider the relational scheme R (A,B,C,D,E,F) and FD_g ABC,
 $C \rightarrow A, D \rightarrow E, F \rightarrow A, E \rightarrow D$
 Is the decomposition of R into R₁ (A, C, D), R₂ (B, C, D) and R₃ (E, F, D) lossless?
 Explain the requirements for lossless decomposition and dependency preserving.
 - e. Compare and contrast the features of log based recovery mechanism versus check pointing based recovery. Suggest applications where you will prefer log based recovery scheme over check pointing.

SECTION C

3. **Attempt any one part of the following:** **7 x 1 = 7**
- (a) Draw and explain the detailed system architecture of DBMS.
 - (b) Explain about Entity Integrity, Referential Integrity, Foreign keys.
4. **Attempt any one part of the following:** **7 x 1 = 7**
- (a). Write the SQL Queries for the given schema
 Student(Name, Studentnumber, Class, Major)

Course(CourseName, CourseNumber, Credit Hours, Department)
Section(SectionIdentifier, coursenum, Semester, Year, Instructor)
Grade_report(studentNumber, SectionIdentifier, Grade)
Prerequisite(Coursenum, Prerequisite Number)

- a) Change the class of student 'Uday' to 2.
- b) Delete the record for the student whose name is 'GEETA' and whose student number is 17.
- c) For each section taught by Prof. Jain., retrieve the course number, semester, year and number of students who took the section.
- d) Retrieve the names of all senior students majoring in 'CS'
- e) Retrieve the names and major departments of all students who have a grade of A in all their courses.

(b). Student(RollNo, Name, Father_Name, Branch)

Book(ISBN, Title, Author, Publisher)

SP(RollNo, ISBN, Date_of_issue)

Answer the following queries in SQL.

- (i) List Roll Number and name of all students of the branch 'CSE'.
- (ii) Find the name of students who have issued a book published by 'ABC' publisher.
- (iii) List title of all books and their author issued by a student 'XYZ'.
- (iv) List title of all books issued on or before Jan, 1, 2011.
- (v) List all books published by publisher 'ABC'

5. Attempt any one part of the following: 7 x 1 = 7

- (a) Define normalization. Explain 1NF, 2NF, 3NF and BCNF using appropriate example.
- (b) What is Query Language. Explain the different operations in Relational Algebra.

6. Attempt any one part of the following: 7 x 1 = 7

- (a) Explain about characterizing schedules based on serializability.
- (b) Write short notes on:
 - i. Shadow Paging
 - ii. Deadlock Avoidance and Recovery in Database Transaction

7. Attempt any one part of the following: 7 x 1 = 7

- (a) What do you mean by time stamping protocols for concurrency control? Discuss multi-version scheme of concurrency control also.
- (b) What do you mean by Locking techniques of concurrency control? Discuss the various locking techniques and recovery with concurrent transaction also in detail.