Printed Pages:02 **Sub Code: ECS 402**

Paper Id: | 1 | 1 | 0 | 4 | 0 | 2 | **Roll No.** | | | | | | | | | | |

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 Hierarchal 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->A, D -> E, F -> A, E -> D
Is the decomposition of R into R_1 (A, C, D), R_2 (B, C, D) and R_3 (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)

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Course(CourseName, CourseNumber, Credit Hours, Department)
Section(Sectionidentifier, coursenumber, Semester, Year, Instructor)
Grade_report(studentNumber, SectionIdentifier, Grade)
Prerequisite(Coursenumber, Prerequisite Number)

a) Change the class of student 'Uday' to 2.

b) Delete the record for the student wose 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,Bate_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 studentswho 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 INF, 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.

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