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322516(22)

B. E. (Fifth Semester) Examination, April-May 2021

(CSE Branch)

DATABASE MANAGEMENT SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Attempt all questions. Part (a) of each question is compulsory and attempt any* ***two*** *parts from remaining parts (b), (c) or (d).*

Unit-I

1. (a) What are different types of attributes in ER Model? 2

(b) A university registrar's office maintains data about the following entities : (a) courses, including number,

title, credits, syllabus, and prerequisties; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) intructors, 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 and E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints. 7

(c) List the advantages of DBMS over file system. 7

(d) Explain B+ tress with example. 7

Unit-II

2. (a) List the various types of integrity constrains in SQL. 2

(b) What is VIEW with example and its importance with respect to security. Can a relation be updated through VIEW. If Yes/NOT. Justify. 7

(c) Consider the relational schema :

ENROLL (S#, C#, Section)	S# represent student number
TEACH (Prof, S#)	C# represent course number
ADVISE (Prof, S#)	Prof is thesis adviser of S#
PRE_REQ (C#, Pre_C#)	Pre_C# is prerequsite course
GRADES (S#, C#, GRADE, Year)	
STUDENT (S#, Sname)	Sname is student name

(i) Specify in SQL 3

Create the table GRADES in SQL with Primary Key as (S# C#) and Foreign Key S# from STUDENT and C# from relation PRE_REQ

(ii) Specify in Relational Algebra 2

List all 'A' Grade students enrolled in second year.

(iii) Specify in SQL 2

Drop the Foreign Key constraint from relation GRADES

(d) How NULL values are handled by DBMS for various operations? 7

Unit-III

3. (a) What does lossless join dependency preserving decomposition mean? 2

(b) Consider the relation $R = (A, B, C, D, E)$ and the set of FD. Give a lossless join dependency preserving decomposition into 3 NF. 7

$$\{A \rightarrow BC, CD \rightarrow E, E \rightarrow A, B \rightarrow D\}$$

(c) Using the schema and the set of FD in question (b) of UNIT-III : 7

(i) List the candidate key of R

(ii) using Armstrong axiom prove that $E \rightarrow D$

(d) Explain the difference between 3 NF and BCNF. 7

Unit-IV

4. (a) What is query execution planner? 2

(b) Explain how the dead locks are handled during concurrent execution of transactions. 7

(c) Explain the structure of query optimizer. 7

(d) What does the recoverable schedule means? Explain with example. 7

Unit-V

5. (a) What is the SHARED and EXCLUSIVE lock means in Lock Based Protocol? 2

(b) How *check-point* can be used to recover the transactions after failure. 7

(c) Explain and compare the deferred and immediate modification version of the log-based recovery scheme in terms of ease of implementation and overhead cost. 7

(d) Explain timestamp ordering protocol. 7