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Printed Pages : 4 **TCS – 402**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1068 Roll No.

B. Tech.

(SEM. IV) EXAMINATION, 2006-07

DATA BASE MANAGEMENT SYSTEM

Time : 3 Hours] *[Total Marks : **100***

Note : *(1) Attempt **all** questions.*

*(2) All questions carry **equal** marks.*

1 Answer any **four** of the following : **5×4=20**

(a) Define the following terms :

(i) Data redundancy and consistency

(ii) Referential Integrity

(iii) Data atomicity

(iv) Domain constraints

(v) Data models.

(b) Draw the overall structure of DBMS and explain its various components.

(c) 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.

(d) Differentiate between database system and file system.

(e) Discuss the candidate key, primary key, super key, composite key and alternate key.

(f) What do you mean by the terms aggregation and generalisation?

2 Answer any **four** of the following : **5×4=20**

(a) Given the relational schema :

ENROLL (S#, C#, Section), S# is student number.
TEACH (Prof, C#, Section), C# is course number.
ADVISE (Prof, S#), Prof is Thesis advisor of S#
PRE-REQ (C#, pre-C#), pre-c# is prerequisite course.
GRADE (S#, C#, grade, year)
STUDENT (S#, Sname), Sname is student name.
Give queries expressed in SQL and tuple calculus.

(i) List of students taking courses with smith or jones.

(ii) List all students taking at least one course that their advisor teaches.

(iii) List those professors who teach more than one section of the same course.

(iv) List all students number and course number

(v) List the student number and course number who got grade A

(b) What are the various characteristics of SQL? Discuss five aggregate functions with a suitable example.

(c) Discuss the selection, projection and join operator of relational algebra with suitable example.

(d) What do you mean by Query and sub-query? Discuss cursors in SQL also.

(e) Discuss the various features of relational data model in detail.

3 Answer any **two** of the following : **10×2=20**

(a) What do you mean by Normalization? Explain BCNF and 3NF with a suitable example.

(b) Describe the term MVD in the context of relational database management system by giving an example. Discuss 4NF and 5 NF also.

(c) What do you mean by decomposition of a relation?

Consider the relational scheme

R (A,B,C,D,E,F) and FD_s

$\mathbf{A \rightarrow BC,\ C \rightarrow A,\ D \rightarrow E,\ F \rightarrow A,\ E \rightarrow D}$

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.

4 Answer any **two** of the following : **10×2=20**

(a) What do you mean by schedule in the context of concurrent execution of transactions in RDBMS? What is serializable schedule? Discuss the various types of serializability with a suitable example.

(b) What do you mean by deadlock? What are the various conditions under which deadlock occurs? Discuss the wait-die and wound-wait in detail.

(c) 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. Give an example of check pointing based recovery scheme. Discuss the recoverable schedule also.

5 Answer any **two** of the following : **10×2=20**

(a) What do you mean by time stamping protocols for concurrency control? Discuss multi-version scheme of concurrency control also.

(b) Discuss the validation based protocol with a suitable example. Expain two phase commit Protocol (2PC) also.

(c) What do you mean by Locking techniques of concurrency control? Discuss the various locking techniques and recovery with concurrent transaction also in detail.
