PAPER ID : 1068

TCS-402 **Printed Pages : 3**

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

Roll No. | | | | | | | | | | |

B. Tech.

(SEM. IV) EXAMINATION, 2010

DATABASE MANAGEMENT SYSTEM

Time : 3 Hours] [Total Marks : 100

Note : (i) Attempt **ALL** questions.
(ii) All Questions carry **equal** marks.
(iii) In case of numerical problems assume data wherever not provided.
(iv) Be precise in your answer.

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

(a) What do you mean by data abstraction? Explain the difference between different levels of data abstraction with proper diagram.

(b) Explain the concept of keys in DBMS. Also describe the different types of keys in details.

(c) Describe the extended E-R features in details. Give suitable diagrams to explain.

(d) Explain two-tier and three-tier architecture of DBMS in details.

(e) What do you mean database language and interfaces? What is the difference between DDL and DML? Explain.

(f) What do you mean by Entity and Relationship in E-R model? Explain different mapping cardinalities with examples.

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

(a) Given the relational schema R = (A, B, C) and S = (D, E, F) and relations r(R) and s(S). Give equivalent SQL statements for each of the following expressions: (i) π A (r) (ii) σ B = 17 (r)

(b) What do you mean by Triggers? How they are different from Assertions? Discuss.

(c) What is union compatibility? Why do the UNION, INTERSECTION, and DIFFERENCE operations require that the relations on which they are applied be union compatible?

(d) Discuss the various types of JOIN operations. Differentiate OUTER and INNER joins.

(e) Discuss the terms domain constraints and key constraints in short. Give suitable examples.

(f) Write short notes on following:

(i) Referential integrity

(ii) Domain calculus

3 Attempt any **four** parts of the following : **5×4=20**

(a) Write and prove Armstrong's Axioms for functional dependencies.

(b) What is the significance of normalization of the database? Define 1NF and 2NF.

(c) What do you mean by canonical cover? Consider the following set F of functional dependencies on schema (A, B, C} :

$A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C$

Compute the canonical cover of F.

(d) What do you mean by multi-valued dependency? Also, explain the concept of 4NF in short.

(e) Discuss lossless join and dependency preservation properties of a decomposition.

(f) Consider the following two sets of functional dependencies :
$F = A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H$ and
$G = A \rightarrow CD, E \rightarrow AH$
Check, whether F and G are equivalent.

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

(a) Explain the ACID properties of transaction. Draw and explain the state diagram of a transaction. What are the different anomalies that may occur due to concurrent execution?

(b) What do you mean by serial and serializable schedules? Explain the concept of conflict serializable and view serializable schedules with examples.

(c) Discuss the procedures of deadlock prevention, detection and recovery in details.

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

(a) Explain the concept and working of locking techniques in concurrency control. What benefit does rigorous two-phase locking provide? How does it compare with older forms of two-phase locking?

(b) What do you mean by timestamps? Discuss timestamp-ordering protocol in details. Also, discuss Thomas' write rule and multiple granularities in short.

(c) What do you mean by log-based recovery? Explain deferred and immediate modification versions of the log-based recovery schemes. Also, compare these in terms of ease of implementation and overhead cost.
