[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

15147

B. Tech 5th Semester Examination

Database Management System (OS)

IT(ID)-5002

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all. Select one question from each of section A, B, C, D. Section E is compulsory.

SECTION - A

1. (a) List any five shortcomings of conventional file system. How DBMS overcome these shortcomings and also give other benefits of DBMS approach which makes it essential for use? (10)

   (b) Explain the Database system structure with a neat diagram and explain its various components. (10)

2. (a) Explain the difference between Internal, External and Conceptual schema. How are these different schema layers related to the concept of logical and physical data independence? (10)

   (b) What is a DBA? Give various roles and responsibilities of a DBA. (10)

SECTION - B

3. Let R = (A, B, C), and let r1 and r2 both be relations on schema R. Give an expression in the domain relational calculus and tuple relational calculus that is equivalent to each of the following:

   (a) Π A(r1) **[P.T.O.]**

   (b) σB=17(r1)

   (c) r1Ur2

   (d) r1\r2

   (e) r1 - r2 (20)

4. Construct an ER diagram for student registration system considering student registration in an engineering college after each semester. Precisely identify the entities and also give method to convert this E-R diagram into relational schema. (20)

SECTION - C

5. (a) What is normalization and give its different types? Show that 5NF implies 4NF. (10)

   (b) What are the SQL constructs to modify the structure of tables, views and to destroy the tables and views? (10)

6. (a) What is functional dependency? Compute the closure of the following set F of functional dependencies for relation scheme R = (A, B, C, D, E)

   $A \rightarrow BC$

   $CD \rightarrow E$

   $B \rightarrow D$

   $E \rightarrow A$ (10)

   (b) What are B-trees? How items are added, deleted from B-trees? Construct a B+ tree to insert the following key elements (order of the tree is 3) 5, 3, 4, 9, 7,15,14, 21, 22, 23. (10)

SECTION - D

7. (a) Explain briefly about the working of two phase locking protocol using a sample transaction. (10)

(b) Discuss the ACID properties of a transaction. Give relevant example. (10)

8. (a) When is a transaction said to be deadlocked? Explain the deadlock prevention methods with an example. (10)

(b) Explain concurrency control mechanisms. Discuss the need with example. (10)

SECTION - E

9. (a) What are data models?

(b) Differentiate between generalization and specialization.

(c) Define triggers. Give example.

(d) Explain dependency preservation with suitable illustration.

(e) When is a functional dependency said to be trivial?

(f) Consider the following relation:

EMP (ENO, NAME, DATE_OF_BIRTH, SEX, DATE_OF_JOINING, BASIC_PAY, DEPT) Develop an SQL query that will find and display the average BASIC_PAY in each DEPT.

(g) Differentiate between B tree and B+tree.

(h) Differentiate static and dynamic hashing.

(i) Distinguish between sparse index and dense index.

(j) What is the difference between WHERE and HAVING clauses in SQL? (2×10=20)