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Roll No. :

B022413(022)

B.Tech. (Fourth Semester) Examination

April-May 2021

(CSE Branch)

DATABASE MANAGEMENT SYSTEM

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Attempt any two parts from (a), (b) and (c) of each unit. Each part carries 10 marks.

Unit-I

1. (a) Explain the purpose of database systems. Differentiate DBMS versus file system.

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- (b) Discuss three levels architecture in DBMS.
- (c) Write about Relational Model. Also explain the concept of keys with the help of suitable example.

Unit-II

2. (a) Explain join operators used in Relational Algebra.
- (b) Consider the relational database

employee(person-name,street,city)

works(person-name,company-name,salary)

company(company-name,city)

managers(person-name,manager-name).

Give an expression in the relational algebra for each request :

- (i) Modify the database so that Jones now lives in Newtown.
- (ii) Give all employees of First Bank Corporation a 10 percent salary raise.
- (iii) Give all managers in this database a 10 percent salary raise.

- (iv) Give all managers in this database a 10 percent salary raise, unless the salary would be greater than \$100,000. In such cases, give only a 3 percent raise.
- (v) Delete all tuples in the works relation for employees of Small Bank Corporation.
- (c) Define Normalization. Explain 3NF and BCNF.

Unit-III

3. (a) Explain the steps in query processing by giving appropriate example.
- (b) What is evaluation plan and equivalence rules in Query optimization.
- (c) Write notes on : (any two)
- (i) Indices
- (ii) B-Trees
- (iii) Hashing

Unit-IV

4. (a) Define Transaction. Write ACID properties of Transaction.

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- (b) What are Concurrent Schedules? Write in detail about serializability.
- (c) What is concurrency control mechanism? Explain Multi-version and Concurrency Control scheme.

Unit-V

5. (a) What are the three pillars of security? Explain DAC, MAC and RBAC.
- (b) What is SQL Injection? How SQL Injection works and its defense mechanism?
- (c) Write notes on : (any **two**)
- (i) Web databases
 - (ii) Distributed databases
 - (iii) Data warehousing and data mining