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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2021 - 2022)

Subject: Database Management Systems

Time: 3 Hours

Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 mark & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A

20

1. Attempt all parts:-

- 1-a. The relationship is represented in E-R diagram as (CO1) 1
- (a) Double diamonds
 - (b) Undivided rectangles
 - (c) Dashed lines
 - (d) Diamond
- 1-b. The Rectangles in E-R diagram represents (CO1) 1
- (a) Entity set
 - (b) Relationship set
 - (c) Attributes of a relationship set
 - (d) Primary key
- 1-c. Which forms simplifies and ensures that there are minimal data aggregates and repetitive groups (CO2) 1
- (a) 1NF
 - (b) 2NF
 - (c) 3NF
 - (d) All of the above
- 1-d. If a table has been normalized so that all determinants are candidate keys, then that table is in: (CO2) 1
- (a) BCNF
 - (b) Second
 - (c) Third
 - (d) First
- 1-e. Which SQL function is used to count the number of rows in a SQL query? (CO3) 1
- (a) COUNT()
 - (b) NUMBER()
 - (c) SUM()
 - (d) COUNT(*)
- 1-f. Which of the following is not a DDL command? (CO3) 1
- (a) UPDATE
 - (b) TRUNCATE
 - (c) ALTER

- (d) None
- 1-g. A Transaction is said to be a unit of program's (CO4) 1
 (a) Evaluation
 (b) Execution
 (c) Computation
 (d) Controlling
- 1-h. A transaction can do read and write operation on a data item when it acquires : (CO4) 1
 (a) read mode
 (b) exclusive mode
 (c) shared mode
 (d) write mode
- 1-i. Which type of command is GRANT? (CO5) 1
 (a) Transaction Control Language (TCL) command
 (b) Data Query Language (DQL) command
 (c) Data Control language (DCL) command
 (d) None of these
- 1-j. What are the major components of the intrusion detection system? (CO5) 1
 (a) Analysis Engine
 (b) Event provider
 (c) Alert Database
 (d) All of the mentioned

2. Attempt all parts:-

- 2-a. Explain the basic structure of a relational database with an example. (CO1) 2
- 2-b. Define First Normal Form. (CO2) 2
- 2-c. What are aggregate functions ? Also list the aggregate functions supported by SQL? (CO3) 2
- 2-d. What is ROLLBACK and COMMIT in DBMS? (CO4) 2
- 2-e. Explain RBAC models . (CO5) 2

SECTION B

30

3. Answer any five of the following:-

- 3-a. What is two tier and three-tier architecture explain with suitable example? (CO1) 6
- 3-b. Explain the concept of Primary key, Candidate Key and Foreign Key. (CO1) 6
- 3-c. Discuss Boyce Codd Normalization Form with an example. (CO2) 6
- 3-d. To find the Keys of relation $R=\{A,B,C,D,E\}$ with FD's $F=\{A \rightarrow BC, CD \rightarrow E, E \rightarrow A, B \rightarrow D\}$. (CO2) 6
- 3-e. What are the different advantages and disadvantages of Database Triggers? (CO3) 6
- 3-f. What is Two phase Locking (2PL)? Define shrinking phase and growing phase. (CO4) 6
- 3-g. What is intrusion prevention system and its types? (CO5) 6

SECTION C

50

4. Answer any one of the following:-

- 4-a. What is ER Diagram? Explain different Components of an ER Diagram with there Notation. Also make an ER Diagram for Employee Project Management System. (CO1) 10
- 4-b. Explain the followings:- (CO1) 10
 a. DDL Interpreter
 b. DDL Compiler

- c. Data dictionary
- d. Query Evaluation Engine
- e. Buffer manager and file manager

5. Answer any one of the following:-

- 5 -a Write short note on: (CO2) 10
- a. Partial and Full Dependency
 - b. Join dependency
 - c. Trivial and Non Trivial dependency
 - d. Open source and commercial DBMS
- 5-b Given a relation R(P, Q, R, S, T, U, V, W, X, Y) and Functional Dependency set $FD = \{ PQ \rightarrow R, P \rightarrow ST, Q \rightarrow U, U \rightarrow VW, \text{ and } S \rightarrow XY \}$, determine whether the given R is in 3NF? If not convert it into 3 NF. (CO2) 10
6. Answer any one of the following:-
- 6-a. Explain different DDL commands in detail with Example. (CO3) 10
- 6-b. What are SQL operators ? Explain different SQL operators with example. (CO3) 10
7. Answer any one of the following:-
- 7-a What do you mean by time stamping protocol for concurrency controlling? Discuss multi version scheme of concurrency control. (CO4) 10
- 7-b List ACID properties of transaction. Explain the usefulness of each. And also explain the importance of log. (CO4) 10
8. Answer any one of the following:-
- 8-a Write characteristics, goals and data view of Logical database. Also gives its advantages and disadvantages? (CO5) 10
- 8-b Explain SQL injection in detail. Give difference between Relational Database Management System (RDBMS) and Object Oriented database Management System (OODBMS). (CO5) 10