Printed Page:-04

Subject Code:- AOE0769

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VII - THEORY EXAMINATION (2024 - 2025)

Subject: Database Management System

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. 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. A set of possible data values is called _____. (CO1,K1) 1

(a) Attribute

(b) Degree

(c) Tuple

(d) Domain

1-b. Identify the option that is not an advantage of a database. (CO1,K2) 1

(a) Sharing of Data

(b) Reduce Data Redundancy

(c) Increase Data Inconsistency

(d) Data Security

1-c. Select the definition of the correct key, which is used to represent relation between two tables? (CO2,K2) 1

(a) Candidate key

(b) Foreign key

(c) Primary key

(d) Super key

1-d. For performing tasks like adding, deleting and updating of tuples in a relation, which of the following is used? (CO2,K2) 1

(a) Data definition language

.

(b) Data control language

(c) Data manipulation language

(d) Transaction control language

1-e. Select _____ dept_name from instructor, Identify the one that displays the unique values of the column. (CO3,K2) 1

(a) All

(b) From

(c) Distinct

(d) Name

1-f. _____ is NOT a type of constraint in SQL language? (CO3,K1) 1

(a) FOREIGN KEY

(b) PRIMARY KEY

(c) UNIQUE

(d) ALTERNATE KEY

1-g. A relation in which every non-key attribute is fully functionally dependent on the primary key and which has no transitive dependencies, is said to be in _____. (CO4,K2) 1

(a) BCNF

(b) 2NF

(c) 3NF

(d) 1NF

1-h. 5NF is designed to cope with _____. (CO4,K1) 1

(a) Transitive dependency

(b) Join dependency

(c) Multi valued dependency

(d) None of these

1-i. If a transaction has obtained a _____ lock, it can read but cannot write on the item. (CO5,K1) 1

(a) Shared mode

(b) Exclusive mode

(c) Read only mode

(d) Write only mode

1-j. The extent of the database resource that is included with each lock is called the level of _____. (CO5,K2) 1

(a) Impact

(b) Granularity

(c) Management

(d) DBMS control

.

2. Attempt all parts:-

2.a.	Explain cardinality of a relationship in E-R Model? (CO1,K2)	2
2.b.	Explain the concept of Foreign Key. (CO2,K2)	2
2.c.	Define Referential Integrity. (CO3,K1)	2
2.d.	Determines the all-possible Candidate keys from given set of FD. R = (A, B, C, D, E, F) and the set of functional dependencies F ={A → C, C → D, D → B, E → F}. (CO4,K3)	2
2.e.	Define Deadlock. (CO5,K1)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Define a data model and explain the relational data model. (CO1,K2)	6
3-b.	Define relation, Schema and Instance in context with relation. (CO1,K1)	6
3-c.	Discuss various types of database languages? Explain any four DDL commands and two DML commands. (CO2,K2)	6
3-d.	Explain ALTER command. Demonstrate with example. (CO2,K3)	6
3.e.	Explain all aggregate functions with example. (CO3,K2)	6
3.f.	Given a relation R(P, Q, R, S, T, U, V, W, X, Y) and Functional Dependency set FD = { PQ → R, PS → VW, QS → TU, P → X, W → Y }, determine whether the given R is in 2NF? If not convert it into 2 NF. (CO4,K3)	6
3.g.	Explain various states of transaction with diagram. (CO5,K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Draw an ER diagram for a university library information system which stores information about books, journals, publishers, students, staff, borrowing of books, and reservation of books. Note that the library may have more than one copy for some of the books. (CO1,K3)	10
4-b.	Convert the following schema into ER Diagram: STUDENT (Student_ID, Student_Name, DOB, Street, City, Pin) CLASS (Class_ID, Class_Name, Student_ID, DateOfJoin, Hours) Student_ID is the foreign key refers STUDENT table SUBJECT (Subject_ID, Subject_Name, Teacher, Student_ID) Student_ID is the foreign key refers STUDENT table SECTION (Section_ID, Class_ID, Section_Name) Class_ID is the foreign key refers CLASS table. (CO1,K2)	10

5. Answer any one of the following:-

5-a.	Consider the following relational database schema student(Student_ID,Stu_Name, Stu_Subject_ID, Stu_Marks, Stu_Age), Subject(Subject_ID, Subject_Name) (i) Write a query to create the table in Structured Query Language. (ii) Write a query to insert the data into the table. (iii) Write a query to view the specific record of the table by using the WHERE clause.	10

.

(iv) Write a query to access the first record from the SQL table. (CO2,K5)

5-b. Write the SQL query for following- 10

1. create a database named college
2. create a table named students with ROLL_NO, NAME , SUBJECT attributes
3. Add columns FATHER NAME and ADDRESS into the existing table.
4. Drop table students.
5. Drop database college. (CO2,K5)

6. Answer any <u>one</u> of the following:-

6-a. Explain the operators SELECT, PROJECT, UNION with suitable examples. 10 (CO3,K2)

6-b. List and explain different types of JOIN. (CO3,K2) 10

7. Answer any <u>one</u> of the following:-

7-a. Let a relation R (A, B, C, D) and functional dependency {AB→C, C→D, D→A}. 10 Relation R is decomposed into R1(A, B, C) and R2(C, D). Check whether decomposition is dependency preserving or not. (CO4,K3)

7-b. Given a relational Schema R(W, X, Y, Z) and set of Function Dependency FD = { 10 W→ X, Y →X, Z→ WXY, WY→ Z }. Find the canonical cover. (CO4,K4)

8. Answer any <u>one</u> of the following:-

8-a. Describe the shadow paging recovery technique. Under what circumstances does it 10 not require a log? (CO5,K3)

8-b. Explain with example how wait-die and wound-wait protocols prevent deadlock 10 and starvation. (CO5,K5)

.