Printed Page:- 04 **Subject Code**:- B**MCA0202**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
MCA
SEM: II - THEORY EXAMINATION (2023 **- 20**24 **)**
Subject: Database Systems

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. Which of the following is generally used for performing tasks like creating the structure of the relations, deleting relation?(CO1) 1

(a) DML
(b) Query
(c) Relational Schema
(d) DDL

1-b. Which of the following is a top-down approach in which the entity's higher level can be divided into two lower sub-entities? (CO1) 1

(a) Aggregation
(b) Generalization
(c) Specialization
(d) All of the above

1-c. Which SQL function is used to count the number of rows in a SQL query?(CO2) 1

(a) INTEGER()
(b) NUMBER()
(c) SUM()
(d) COUNT(*)

1-d. The core of primary key constraint is given by (CO2) 1

(a) NOT NULL, CHECK

(b) NOT NULL, DEFAULT

(c) NOT NULL, FOREIGN KEY

(d) NOT NULL, UNIQUE

1-e. The _____ operation, denoted by −, allows us to find tuples that are in one relation but are not in another. (CO3) 1

(a) Union

(b) Set-difference

(c) Difference

(d) Intersection

1-f. The common column is eliminated in (CO3) 1

(a) theta join

(b) outer join

(c) natural join

(d) composed join

1-g. Which of the following optional structure is used to improve the performance of a query performed on a table in SQL? (CO4) 1

(a) View

(b) Index

(c) Constraint

(d) Table

1-h. Can we insert and delete rows into a View? (CO4) 1

(a) Yes

(b) No

(c) Rows of data can be inserted but can not deleted

(d) Rows of data can be deleted but cacn not inserted

1-i. Which of the following is not a NoSQL database? (CO5) 1

(a) SQL Server

(b) MongoDB

(c) Cassandra

(d) None of the mentioned

1-j. NoSQL databases is used mainly for handling large volumes of _____ data.(CO5) 1

(a) unstructured

(b) structured

(c) semi-structured

(d) all of the mentioned

2. Attempt all parts:-

2.a. Define the terms Database Management System. 2

2.b.	List various data constraints in SQL.	2
2.c.	How would you write a query to find all records where a column called "NAME' starts with the letter 'A'?	2
2.d.	What are the properties of a transaction?	2
2.e.	Write the full from of BASE	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Explain Physical Schema & Logical Schema with suitable example. (CO1)	6
3-b.	Draw ER diagram for student information system. (CO1)	6
3-c.	Differentiate lossless and lossy join decomposition with suitable example.(CO2)	6
3-d.	Define partial functional dependency. How 2NF differs from 3NF? (CO2)	6
3.e.	Write the SQL syntax for cross product, left outer join, right outer join & full outer join .(CO3)	6
3.f.	Describe all the states that a transaction goes through with examples (CO4)	6
3.g.	Describe the terms 'Replication and 'Sharding'. Discuss its advantages with an example. (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Write any ten advantages of DBMS over file system. (CO1)	10
4-b.	Explain the logical and physical data independence in detail. (CO1)	10

5. Answer any one of the following:-

5-a.	Consider the following Relations TEACHER(TeacherID, Tname, Department) STUDENT(RollNo, Sname, Branch) TEACHES(TeacherID, RollNo, Subject) Write SQL queries for the following: i) List the name and branch of student registered for the subject ‘DBMS’. ii) List the name of the teachers and their corresponding department who are offering either ‘DBMS’ or ‘Operating System’. iii) List the names of teachers who teach ‘DBMS’ and ‘OS’ iv) List the names of teachers who do not teach ‘DBMS’ (CO2)	10
5-b.	Suppose, a relational schema R (A, B, C, D, E) and set of functional dependencies: F { A-> BC, CD-> E, B-> D, E-> A } Compute CD+ , E + (closure of attribute set CD, attribute E respectively) (CO2)	10

6. Answer any one of the following:-

6-a.	Explore the significance of EXISTS and NOT EXISTS operators in SQL queries.Provide examples demonstrating the use of EXISTS and NOT EXISTS to test for the existence or non-existence of rows based on sub-query results. (CO3)	10
6-b.	Examine the performance implications of using LIKE, DISTINCT, and BETWEEN operators in SQL queries. Analyze the impact of data distribution and	10

cardinality on query performance when using LIKE, DISTINCT, and BETWEEN in large datasets. (CO3)

7. Answer any one of the following:-

7-a.	Write a PL/SQL program that uses a cursor to fetch all records and prints the highest salary (CO4)	10
7-b.	Write a PL/SQL function to print the factorial of a number. How function differs from procedure in PL/SQL(CO4)	10

8. Answer any one of the following:-

8-a.	Describe the terms collections, documents, fields and values. Write syntax of CRUD Operations with Examples (CO5).	10
8-b.	Describe all the types of data models of NoSQL. How MongoDB differs from Oracle? (CO5)	10