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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA

SEM: II - THEORY EXAMINATION (2025 - 2026)

Subject: Database 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:-

- | | | |
|-------|---|---|
| (1.1) | Which one of the following is a type of Data Manipulation Command? [CO1, K1] | 1 |
| | (a) Create | |
| | (b) Alter | |
| | (c) Delete | |
| | (d) All of the above | |
| (1.2) | In which one of the following, the multiple lower entities are grouped (or combined) together to form a single higher-level entity? [CO1, K1] | 1 |
| | (a) Aggregation | |
| | (b) Generalization | |
| | (c) Specialization | |
| | (d) All of the above | |
| (1.3) | Which of the Following are aggregate functions in SQL [CO2, K1] | 1 |
| | (a) SUM() | |
| | (b) Avg() | |
| | (c) Count() | |
| | (d) All of the above | |
| (1.4) | If multiple columns are used by primary key, then it is called [CO2, K2] | 1 |
| | (a) Unique Key | |
| | (b) Composite Key | |
| | (c) Foreign key | |
| | (d) None of the above | |

- (1.5) The common column is eliminated in [CO3, K1] 1
- (a) theta join
 - (b) outer join
 - (c) natural join
 - (d) composed join
- (1.6) Which SQL statement will return distinct job titles from the "jobs" table? [CO3, K3] 1
- (a) SELECT DISTINCT job_title FROM jobs;
 - (b) SELECT job_title FROM jobs GROUP BY job_title;
 - (c) SELECT UNIQUE job_title FROM jobs;
 - (d) SELECT job_title FROM jobs ORDER BY DISTINCT;
- (1.7) Which of the following statements can be used to terminate a PL/SQL loop? [CO4, K1] 1
- (a) GOTO
 - (b) EXIT WHEN
 - (c) CONTINUE WHEN
 - (d) KILL
- (1.8) Which of the following is not a transaction state. [CO4, K1] 1
- (a) Rollback
 - (b) Aborted
 - (c) Active
 - (d) Partially committed
- (1.9) MongoDB stores all documents in _____ [CO5, K1] 1
- (a) tables
 - (b) collections
 - (c) rows
 - (d) all of the mentioned
- (1.10) In MongoDB, what is a "document"? [CO5, K1] 1
- (a) A group of tables
 - (b) A group of records
 - (c) A single record
 - (d) A type of index

2. Attempt all parts:-

- (2.1) Define the term Database Management System. [CO1, K2] 2
- (2.2) Discuss Order By Clause with example. [CO2, K2] 2
- (2.3) Discuss the need of 'ALIAS' keyword in SQL. [CO3, K2] 2
- (2.4) Discuss Durability and explain its use with an example. [CO4, K2] 2
- (2.5) Write two advantages of MongoDB [CO5, K2] 2

SECTION-B

30

Answer any one of the following:-

- (3.1) Differentiate between Database Management System and file based system [CO1, 6

K2]

- (3.2) What is data independence. Explain both types of data independence with the help of examples. [CO1, K2] 6

Answer any one of the following:-

- (3.3) Explain Referential Integrity Constraint. [CO2, K2] 6

- (3.4) Explain all the types of anomalies which can arise in a database. [CO2, K2] 6

Answer any one of the following:-

- (3.5) Differentiate between left outer join, right outer join and full outer join. [CO3, K2] 6

- (3.6) Apply the SQL operators LIKE and BETWEEN by writing suitable queries to filter records from a table. Demonstrate their use with appropriate examples. [CO3, K3] 6

Answer any one of the following:-

- (3.7) Explain the role of growing phase and shrinking phase in two phase locking protocol. [CO4, K2] 6

- (3.8) Check whether the given schedule S is conflict serializable or not- R1(A) , R2(A) , R1(B) , R2(B) , R3(B) , W1(A) , W2(B). [CO4, K3] 6

Answer any one of the following:-

- (3.9) Describe the methods insertOne(), insertMany(), deleteMany() , with the help of examples. [CO5, K3] 6

- (3.10) Differentiate between relational and non-relational databases. [CO5, K2] 6

SECTION-C 50

4. Answer any one of the following:-

- (4.1) Write ten characteristics of DBMS. [CO1, K2] 10

- (4.2) Draw an ER diagram of a Company database system and justify the relationships among the entities used. [CO1, K5] 10

5. Answer any one of the following:-

- (5.1) Explain all the types of keys used in databases with the help of an example. [CO2, K2] 10

- (5.2) **Given Relation:** R(A, B, C, D, E) 10
Functional Dependencies (F):

1. A -> B
2. BC -> D
3. E -> C
4. D -> A

Compute the closure of attribute set {C, E}⁺ and find the candidate key

[CO2, K3]

6. Answer any one of the following:-

- (6.1) Explain the basic functionality of the AND, NOT, and OR operators in SQL. Provide examples to illustrate how each operator is used in filtering query results. [CO3, K3] 10

- (6.2) Consider the following schema 10
 STUDENT(Roll_no, Name, Branch, Year, Section, Hostel, F_name, Address)
 BOOK(Book_id, Title, Author, Publisher, Cost, Copies)
 TRANS(Rollno, Bookid, Date_issue, date_return, fine)
 (i) To display students name who have issued OS book by Tannenbaum
 (ii) To display the total cost of all books
 (iii) To display the name of students who are in section 'A' and live in 'Delhi'
 (iv) To display the books published by publisher 'ABC' sorted in ascending order of title[CO3, K3]
7. Answer any one of the following:-
- (7.1) Determine whether the following schedule is conflict serializable or not T1: R(x), 10
 T2:R(x), T1:W(x), T2:R(y), T3:R(z), T2:W(z), T3:W(x), T3:W(y), T2:W(y),
 T3:W(z) [CO4, K3]
- (7.2) Explain the reasons why concurrent schedules should take place. [CO4, K2] 10
8. Answer any one of the following:-
- (8.1) Discuss the features of MongoDB in detail. [CO5, K2] 10
- (8.2) Write MongoDB Queries to : 10
 1) create a collection
 2) insert 2 records in it
 3) find all documents
 4) delete only one record
 5) update many records . [CO5, K3]