Printed Page:- 04 Subject Code:- AMICSE0506

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech(Integrated)

SEM: V - 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 weak relationship is represented in E-R diagram as (CO1,K1) 1

(a) Double diamonds

(b) Undivided rectangles

(c) Dashed lines

(d) Diamond

1-b. Generalization is a _____ approach. (CO1,K1) 1

(a) bottom-up

(b) top-down

(c) Specialized

(d) None of the above

1-c. SQL function that is used to count the number of rows in a SQL query? (CO2,K1) 1

(a) COUNT()

(b) NUMBER()

(c) SUM()

(d) COUNT(*)

1-d. Out of the following which query retrieves rows from more than one table or view: (CO2,K2) 1

(a) Start

(b) End

(c) Join
(d) All of the mentioned

1-e. A relation that has no partial dependencies is in which normal form. (CO3,K1) 1
(a) First
(b) Second
(c) Third
(d) BCNF

1-f. 5NF is designed to cope with : (CO3) 1
(a) Transitive dependency
(b) Join dependency
(c) Multi valued dependency
(d) None of these

1-g. A Transaction is said to be a unit of programs _____. 1
(a) Evaluation
(b) Execution
(c) Computation
(d) Controlling

1-h. Out of the given graph which describes deadlock precisely? (CO4) 1
(a) Wound wait graph
(b) Wait die graph
(c) Wait for graph
(d) None of the mentioned

1-i. NoSQL databases are used mainly for handling large data volumes of this category. 1
(a) unstructured
(b) structured
(c) semi-structured
(d) all of the mentioned

1-j. A record in MongoDB is a ___. (CO5) 1
(a) Table
(b) Document
(c) Record
(d) None of the above

2. Attempt all parts:-

2.a. Define Instances and schemas of database? (CO1,K1) 2

2.b. Define Mapping Cardinality with example. (CO2,K1) 2

2.c. 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 → 2

F}. (CO3,K6)

2.d.	Discuss the different states of the transaction.(CO4,K2)	2
2.e.	Discuss the data types in MongoDB. (CO5,K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Give two examples with syntax for each type of command: DDL, DML, DCL,TCL. (CO1,K2)	6
3-b.	Explain Three-Tier Architecture of DBMS with diagram. (CO1,K4)	6
3-c.	Explain Group by, Having clause of SQL with example (CO2,K4)	6
3-d.	Explain ALTER command. Demonstrate with example. (CO2,K4)	6
3.e.	To compute the closure for relation schema R ={A,B,C,G,H,I} and F= {A → B,A → C,CG → H, CG → I,B → H,C → G). Find the closure of A under F . Or {A+ =}. (CO3,K3)	6
3.f.	Elaborate the term serializability. Discuss the conflict and view serializability with example. (CO4,K2)	6
3.g.	Discuss the different types of NoSQL databases. (CO5,K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Construct E-R diagram for a hospital with a set of patients and medical doctors. Associate with each patient a log of various tests and examinations conducted. (CO1,K5)	10
4-b.	Construct 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,K5)	10

5. Answer any one of the following:-

5-a.	Explain the following SQL Operators with examples: (1) Order by (2) BETWEEN (3) Exists (4) AND and OR (CO2,K4)	10
5-b.	Consider the following relations : Hotel {hotelNo, name, address}, Room {roomNo, hotelNo, type, price}, Booking {hotelNo, guestNo, dateFrom, dateTo, roomNo}, Guest {guestNo, name, address}. Write the SQL statements for the following: (i) List the names and addresses of all guests in Chandigarh, alphabetically ordered by name. (ii) List all family rooms with a price below Rs.400 per night, in ascending order of price. (CO2,K5)	10

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

6-a.	Consider a relation R(X Y Z W P) is decomposed into R1(X Y Z) and R2(Z W P). determine whether the decompositions are Lossless or Lossy? (CO3,K6)	10
6-b.	R(A,B,C,D,E,F) is a relation such that AB→ C, C → DE, E → F, F → A. Check the highest normal form that exists in this relation. (CO3,K4)	10

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

7-a.	Consider the transactions T1, T2, and T3 and the schedules S1 and S2 given below. T1: r1(X);r1(Z);w1(X);w1(Z) T2: r2(Y);r2(Z);w2(Z) T3: r3(Y);r3(X);w3(Y) S1: r1(X);r3(Y);r3(X);r2(Y);r2(Z); w3(Y);w2(Z);r1(Z);w1(X);w1(Z) S2: r1(X); r3(Y); r2(Y); r3(X); r1(Z); r2(Z); w3(Y); w1(X); w2(Z); w1(Z) Analyze which one of the schedules is conflict-serializable? (CO4,K4)	10
7-b.	Discuss the deferred update technique of recovery. Explain the advantages and disadvantages of this technique. Provide a reason for its name, the NO-UNDO/REDO method. (CO4,K4)	10

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

8-a.	Explain CAP theorem and the applications of CAP theorem. (CO5,K4)	10
8-b.	Describe CRUD operations with suitable examples. (CO5,K2)	10