04/01/2023 - FN.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 70006

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Third Semester

Artificial Intelligence and Data Science

AD 3391 — DATABASE DESIGN AND MANAGEMENT

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the concept of specialization in ER diagram.
2. What is sequence diagram? and why do we use it?
3. Define the terms relation schema.
4. Why null values might be introduced into the database.
5. What is partial functional dependencies? Give example
6. What is the lossless join property of decomposition? Why is it important?
7. What is a transaction?
8. Why must lock and unlock be atomic operations?
9. What are the two kinds of new data types supported in object-database systems?
10. When to use SQL and NOSQL?

PART B — (5 × 13 = 65 marks)

11. (a) State and explain the database system development life cycle with an example.

Or

(b) Explain the following terms briefly in E-R model: attribute, domain, entity, relationship, entity set, relationship set, one-to-many relationship, many-to-many relationship, participation constraint, overlap constraint, covering constraint, weak entity set, aggregation, and role indicator.

12. (a) (i) Describe the four clauses in the syntax of a simple SQL retrieval query. Show what type of constructs can be specified in each of the clauses. Which are required and which are optional? (7)

(ii) State the need for triggers. When to use triggers and when not to use triggers? Explain with example. (6)

Or

(b) Discuss how NULLs are treated in comparison operators in SQL. How are NULLs treated when aggregate functions are applied in an SQL query? How are NULLs treated if they exist in grouping attributes?

13. (a) Discuss the correspondences between the ER model constructs and the relational model constructs. Show how each ER model construct can be mapped to the relational model and discuss any alternative mappings.

Or

(b) What is the need for normalization? Discuss the various normalization technique used with example.

14. (a) What is the function of locking protocol? State and explain the two-phase locking with example.

Or

(b) (i) Define these terms: atomicity, consistency, isolation, durability, schedule, blind write, dirty read, unrepeatable read, serializable schedule, recoverable schedule, avoids-cascading-aborts schedule. (7)

(ii) Compare binary locks to exclusive/shared locks. Why is the latter type of locks preferable? (6)

15. (a) (i) What are collection hierarchies? Give an example that illustrates how collection hierarchies facilitate querying. (7)

(ii) Discuss how a DBMS exploits encapsulation in implementing support for ADTs (6)

Or

(b) (i) What are indexes in MongoDB? State and explain different types of index with example. (7)

(ii) State and explain the Hbase data model and CRUD operations with example. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Consider the following relations.

Suppliers (sid:integer sname:string address:string)

Parts(pid:integer pname:string color:string)

Catalog(sid:integer pid:integer cost:real)

Write SQL statement for the following queries (5 × 3 = 15)

(i) Construct the E-R Diagram for the schema given.

(ii) Find the names of suppliers who supply some red part.

(iii) Find the sids of suppliers who supply some red part or are at No: 1, Anna Salai.

(iv) Find the pids of parts supplied by at least two different suppliers.

(v) Find the pids of the most expensive parts supplied by suppliers named sam.

Or

(b) A car-rental company maintains a database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number, license number, manufacturer, model, date of purchase, and color. Special data are included for certain types of vehicles:

- Trucks: cargo capacity.
- Sports cars: horsepower, renter age requirement.
- Vans: number of passengers
- Off-road vehicles: ground clearance, drivetrain (four-or two-wheel drive).

Construct an SQL schema definition for this database. Use inheritance where appropriate.

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Anna University

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AID (Artificial Intelligence & Data Science Engineering)

1st Semester | 2nd Semester | 3rd Semester | 4th Semester

5th Semester | 6th Semester | 7th Semester | 8th Semester

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- Matrices and Calculus - MA3151
- Engineering Physics - PH3151
- Engineering Chemistry - CY3151
- Problem Solving and Python Programming - GE3151

2nd Semester

- Professional English - II - HS3252
- Statistics and Numerical Methods - MA3251
- Engineering Graphics - GE3251
- Physics for Information Science - PH3256
- Basic Electrical and Electronics Engineering - BE3251
- Data Structures Design - AD3251

3rd Semester

- Discrete Mathematics - MA3354
- Digital Principles and Computer Organization - CS3351
- Database Design and Management - AD3391
- Design and Analysis of Algorithms - AD3351
- Data Exploration and Visualization - AD3301
- Artificial Intelligence - AL3391

4th Semester

- Environmental Sciences and Sustainability - GE3451
- Probability and Statistics - MA3391
- Operating Systems - AL3452
- Machine Learning - AL3451
- Fundamentals of Data Science and Analytics - AD3491
- Computer Networks - CS3591

5th Semester

- Deep Learning - AD3501
- Data and Information Security - CW3551
- Distributed Computing - CS3551
- Big Data Analytics - CCS334
- Elective 1
- Elective 2

6th Semester

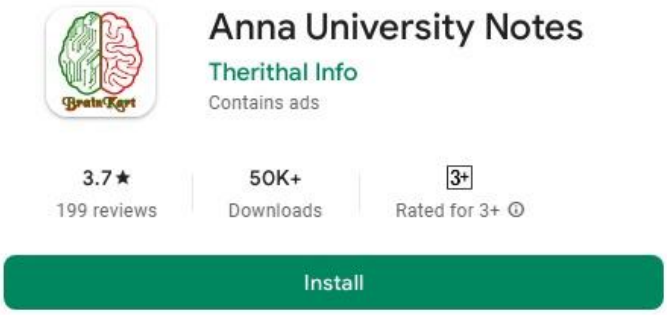
- Embedded Systems and IoT - CS3691
- Open Elective-1
- Elective-3
- Elective-4
- Elective-5
- Elective-6

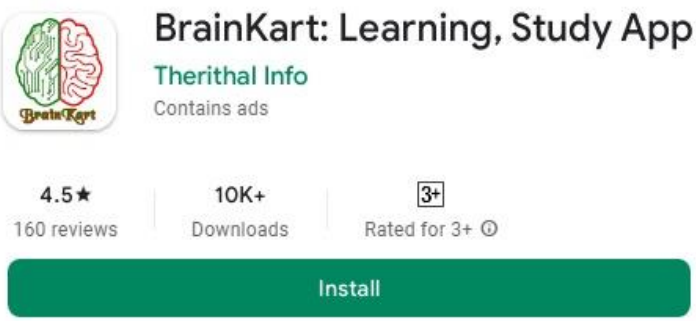
7th Semester

- Human Values and Ethics - GE3791
- Open Elective 2
- Open Elective 3
- Open Elective 4
- Management Elective

8th Semester

- Project Work / Intership





All Computer Engg Subjects - [B.E., M.E.,]		(Click on Subjects to enter)
Programming in C	Computer Networks	Operating Systems
Programming and Data Structures I	Programming and Data Structure II	Problem Solving and Python Programming
Database Management Systems	Computer Architecture	Analog and Digital Communication
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Theory of Computation	Computer Graphics	Distributed Systems
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Artificial Intelligence	Software Testing	Grid and Cloud Computing
Data Ware Housing and Data Mining	Cryptography and Network Security	Resource Management Techniques
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