APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Second Semester MCA (2 Year) Degree Regular and Supplementary Examination June 2023

Course Code: 20MCA102
Course Name: ADVANCED DATABASE MANAGEMENT SYSTEMS

Max. Marks: 60   Duration: 3 Hours

PART A
Answer all questions, each carries 3 marks.   Marks

1	Explain the concepts of physical data independence and logical data independence with a typical real-world example for each.	(3)
2	Explain any three mapping constraints used in the ER Model using appropriate examples	(3)
3	Consider the relation R(A, B, C, D, E, F) with the FDs {AB->C, BC->AD, D->E, CF->B}. Compute {A, B}$^+$	(3)
4	Differentiate between BCNF and 3NF with an example	(3)
5	Define deadlock and discuss any two strategies for managing deadlocks.	(3)
6	What is a transaction log? Why is it used for?	(3)
7	Explain Open Hashing and Closed Hashing	(3)
8	Differentiate between Dense index and Sparse index with example.	(3)
9	Define Fragmentation. Consider a College database that keeps records of all registered students in a Student table with the schema. Student (RegNo, Name, Course, Address, Semester, Fees, Marks). Create a fragment for the accounts section of the college to store the fees details of the registered students.	(3)
10	Explain the use of gossip protocol in Cassandra.	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module 1

11	Write briefly on any six advantages of database approach over conventional file-based approach.	(6)

OR

12	Draw an E-R diagram of a library database with entities Book, Publisher, Staff, and Readers. Assign significant relationships between the entities. Use meaningful names for entities and relationships. Also, there should be an ISA relationship in the diagram.	(6)

Module II

13 (a) Explain the inference rules (Armstrong's Axioms) for Functional dependency. (3)

(b) Explain functional dependency and various types of FDs. (3)

OR

14 Explain the Minimal Cover algorithm. Given a relation M(P,Q,R,S,T,U) with (2)
FDs, E={P → R, PQ → R, R → SU, RS → U, TR→ PQ}. Compute the minimal (4)
cover of E

Module III

15 Explain the transaction recovery process. Differentiate the deferred-write and (6)
write-through transaction recovery procedures.

OR

16 Briefly discuss on the two-phase locking protocol used in concurrency control. (6)
How does it ensure concurrency?

Module IV

17 Explain the various RAID levels with appropriate diagrams (6)

OR

18 Describe the steps of query processing and evaluate the query processing cost of (6)
primary index with equality on key and non-key attribute.

Module V

19 Discuss about the process of sharding and replication in MongoDB (6)

OR

20 (a) Analyse the concept of object-oriented databases and distributed databases. (3)

(b) What is type inheritance and table inheritance? (3)

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