Total No. of printed pages = 4

63/2 (SEM-3) MCA 3·1

2022

(Held in 2023)

MCA

(Theory Paper)

Paper Code : MCA-3·1

(Database Management Systems)

Full Marks – 75

Pass Marks – 30

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer any *five* of the following questions : 1×5=5

(a) Which normal form follows transitive property ?

(b) What is the purpose of normalization in DBMS ?

(c) What do you understand by prime attribute ?

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(d) What is the difference between primary key and foreign key ?

(e) What is catalog (meta-data) ?

(f) The entity integrity constraint states that no primary value can be _____. (Fill in the blank)

2. Answer any *five* of the following questions : 3×5=15

(a) Mention the difference between atomic and composite attributes.

(b) Define select and project operation with examples.

(c) Write a relational algebra operation for retrieving the name of employee whose salary is less than or equal to Rs. 35,000.

(d) Write a relational algebra operation for retrieving first name and last name and salary of all employees who work in department no. 3.

(e) Write an SQL statement for the schema Student (EName, SSN, Dnum, Address) using CREATE, INSERT, UPDATE.

(f) What is Relation Schema ? Differentiate between relation and relation state.

3. Answer any *four* of the following questions : 6×4=24

(a) Discuss the ACID properties.

(b) Define join operation. Discuss the variation of join operation with example.

(c) Write an SQL for the following :

(i) Retrieve the Project name and project number of the employee(s) whose name is 'John Smith'.

(ii) Retrieve the names of employees who work on all the projects that 'John Smith' works on.

(d) Write an algorithm for testing conflict serializability of a schedule S. Discuss the algorithm with example.

(e) Explain DBMS and its advantages.

4. Answer any *three* of the following questions : 7×3=21

(a) Design an ER diagram for Student Management System for Bodoland University containing entities namely, Student, Department, Examination, Administration, etc.

(b) Discuss informal design guidelines for relation schema.

(c) Write an algorithm for finding Minimal Cover F for a set E of functional dependencies. A set of FDs for the relation R (A, B, C, D, E, F) is AB→C, C→A, BC→D, ACD→B, BE→C, EC→FA, CF→BD, D→E. Find a minimal cover for this set of FDs.

(d) What is the two-phase locking protocol? How does it guarantee serializability?

5. Write short notes on any *two* of the following: 5×2=10

(a) Normal Forms (1NF, 2NF, 3NF, BCNF)

(b) Division Operation

(c) Full and Partial Functional Dependency

(d) Dirty Read Problem.