S.No. : 316 NCS 4401

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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 43209 Roll No. 1 2 4 0 [redacted]

B. Tech. Examination, 2026

(Even Semester)

DATABASE MANAGEMENT SYSTEMS

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION–A

1. Attempt all parts of the following : 8×1=8

(a) Define database system.

(b) What are the advantages of DBMS?

(c) What is a weak entity?

(d) Explain derived attribute.

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(e) What is aggregate functions?

(f) What is the purpose of the WHERE clause?

(g) Define ACID property.

(h) Define checkpoints in recovery.

SECTION – B

2. Attempt any two parts of the following : 2×6=12

(a) Explain different types of database users and their roles in DBMS.

(b) Describe specialization and generalization in the enhanced ER model with examples.

(c) Explain Boyce-code normal form and how it differs from third normal form.

(d) Explain recoverable and non-recoverable schedules with examples.

SECTION – C

Note :– Attempt all questions. Attempt any two parts from each questions. 8×5=40

3. (a) Explain three tier DBMS artitecture with neat diagram.

(b) What is language in DBMS? Explain DDL and DML language.

(c) Explain data abstraction and discuss its levels with suitable examples.

4. (a) What are the mapping constraints in an ER-model? Explain different types of mapping constraints.

(b) Explain operations of relational algebra :

(i) Selection

(ii) Projection

(iii) Joins

(c) Define concepts of super key, candidate key, primary key and foreign key.

5. (a) Consider a student table (Roll no., Name, Marks, Dept.) :

(i) Write a query to create a student table.

(ii) Display the student's detail, who's scoring highest marks in a table.

(iii) Write a subquery to find students whose marks are above average.

(b) Define anomaly and different types of anomalies.

(c) Given a relation R (A, B, C, D, E, F) with functional dependencies :

$$A \rightarrow BC$$

$$CD \rightarrow E$$

$$B \rightarrow D$$

$$E \rightarrow F$$

Find all candidate keys of relation R and also list all prime and non-prime attributes of relation R.

6. (a) What is transaction? Describe different transaction states with the help of a state transition diagram.

(b) Explain strict two-phase locking (strict-2PL) and its advantages.

(c) Describe deadlock detection and recovery techniques.

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