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**1 (Sem-4) COM 2**

**2025**

**COMPUTER SCIENCE**

Paper : COM0400204

**( Database Management System )**

Full Marks : 45

Time : Two hours

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

1. Answer the following questions : 1×5=5

(a) What is DBMS ?

- (i) DBMS is a collection of queries.
- (ii) DBMS is a high-level language.
- (iii) DBMS is a programming language.
- (iv) DBMS stores, modifies and retrieves data.

- (b) What does an RDBMS consist of?
- (i) Collection of records
  - (ii) Collection of keys
  - (iii) Collection of tables
  - (iv) Collection of fields
- (c) Which command is used to remove a relation from an SQL?
- (i) Drop table
  - (ii) Delete
  - (iii) Purge
  - (iv) Remove
- (d) Which data structure is used in Hierarchical model records?
- (i) Graph
  - (ii) Tree
  - (iii) Linked list
  - (iv) Stacks

- (e) Which normalization form is based on the transitive dependency?
- (i) 1NF
  - (ii) 2NF
  - (iii) 3NF
  - (iv) BCNF

2. Answer the following questions : **(any five)**  
2×5=10

- (a) Define data and database.
- (b) Define primary key and candidate key.
- (c) What do you mean by functional dependency?
- (d) Define Multiuser database system.
- (e) How can you say that a table is in 2nd normal form?
- (f) What is the basic difference between partial and full functional dependency?
- (g) What do you mean by transaction in DBMS?

- (h) Write *two* advantages of DBMS.
- (i) Write the syntax of 'Alter table' command in SQL.
- (j) Differentiate between strong and weak entity.

3. Answer the following questions : **(any four)**  
5×4=20

- (a) Differentiate between Traditional file approach and database approach.
- (b) Briefly explain the three-tier architecture of DBMS with proper diagram.
- (c) Given the following relation and functional dependencies :

$$R(A, B, C, D)$$

$$AB \rightarrow CD$$

$$D \rightarrow A.$$

Find the candidate key.

- (d) Given the following relation and functional dependencies :

$$R(A, B, C, D, E)$$

$$AB \rightarrow CD$$

$$D \rightarrow A$$

$$BC \rightarrow DE.$$

Identify the normal form of the above relation and justify your answer.

- (e) Briefly explain the ACID properties of transaction.
- (f) Briefly explain the transaction states with proper diagram.
- (g) Given the following table :  
Employee (E\_id, E\_name, E\_address, E\_DoJ, E\_Salary)  
Write the SQL statements for the following questions :
- (i) Get the details of all employees. 1
- (ii) Get the name of employees whose name start or end with 'R'. 1
- (iii) Find the maximum salary from all the employees. 1

(iv) Get the address of employees who are joining before "01-01-2020".

1

(v) Increase the salary by 10,000 of all employees.

1

(h) Briefly explain the Client/Server database system.

4. Answer the following questions : *(any one)*

10×1=10

(a) Draw an E-R diagram of a company database in which the following properties should be included :

(i) all type of attributes

(ii) all type of entities

(iii) all type of relationships

(iv) types of participation

(v) minimum *four* entities

(b) Explain the lost update problem with a suitable example.

(c) Briefly explain object-based data model and physical data model.

(d) Write *five* responsibilities of DBA. Differentiate between left outer join and right outer join with an example.