Paper ID : 250476

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2024-25
BASICS OF DATA BASE MANAGEMENT SYSTEM

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **02 x 7 = 14**

Q no.	Question	CO	Level
a.	What are the three levels of data abstraction in a DBMS?	1	K1
b.	Differentiate between entity integrity and referential integrity.	1	K2
c.	Differentiate between DDL and DML with one example each.	3	K2
d.	List all prime and non-prime attributes In Relation R(A,B,C,D,E) with FD set F = {AB→C, B→E, C→D}.	3	K2
e.	When is a transaction Rolled Back?	5	K2
f.	What are ACID properties of Transaction?	5	K1
g.	What is Lock in Transaction Management?	5	K1

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

Q no.	Question	CO	Level
a.	A database is being constructed to keep track of the teams and games of a sport league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of players participating in each game for each team, the positions they play in that game and the result of the game. (i) Design an E-R schema diagram for this application. (ii) Map the E-R diagram into relational Model	2	K3
b.	Explain the method of testing the serializability. Consider the schedule S1 and S2 given below S1: R1(A),R2(B),W1(A),W2(B) S2: R2(B),R1(A),W2(B), W1(A) Check whether the given schedules are conflict equivalent or not?	5	K3
c.	What is Log? How is it maintained? Discuss the features of deferred database modification and immediate database modification in brief.	5	K2
d.	Discuss the types of users in DBMS. How does a database administrator (DBA) differ from an end-user? Explain the roles and responsibilities of a DBA.	1	K3
e.	What is Aggregate function in SQL? Write SQL query for aggregate function.	3	K2

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SECTION C

3. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Create a table STUDENT with the following structure: • StudentID (Primary Key) • Name (VARCHAR) • Age (Integer) • Department (VARCHAR) • Marks (Number) Include constraints for primary key, NOT NULL, and CHECK (Marks >= 0).Also, write SQL statements to: Insert 3 student records	3	K3
b.	Explain the following types of database security with examples: • Physical security • OS-level security • Network-level security • Database-level security Also, mention how these layers complement each other in a secure architecture.	5	K3

4. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Consider the following schema for institute library: Student (RollNo, Name, Father_ Name, Branch) Book (ISBN, Title, Author, Publisher) Issue (RollNo, ISBN, Date-of –Issue) Write the following queries in SQL: (i) List roll number and name of all students of the branch 'CSE'. (ii) Find the name of student who has issued a book published by 'ABC' publisher. (iii) List title of all books and their authors issued to a student 'RAM'. (iv) List title of all books issued on or before December 1, 2020. (v) List all books published by publisher 'ABC'	3	K3
b.	Write a short description of following terms: Super Key, Candidate Key, Primary Key, Alternate Key, Foreign Key and Composite Key	2	K1

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5. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain different types of join operations in relational algebra: inner join, natural join, outer join, equi-join with examples.	3	K2
b.	Given the following set of FDs on schema R (V,W,X,Y,Z) {Z→V, W→Y, XY→Z, V→WX}.State whether the following decomposition are loss-less-join decompositions or not. (i) R1=(V,W,X) and R2= (V, Y, Z) (ii) R1=(V,W,X) and R2=(X, Y, Z)	4	K3

6. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Let relation R(A, B, C, D) have the following functional dependencies: **F** = {A → B, B → D, A → C} **G** = {A → BD, A → C} Check whether F and G are equivalent. Use closure of F and G and explain your reasoning clearly.	4	K3
b.	Discuss the procedure of deadlock detection and recovery in transaction.	5	K2

7. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Consider the relation R(A, B, C, D, E) with functional dependencies: A → B, B → C, CD → E, E → A (i) Find the candidate keys. (ii) Determine if the relation is in 2NF or 3NF. (iii) Normalize the relation to BCNF.	4	K3
b.	Explain Recovery from Concurrent Transaction.	5	K2