PAPER ID-310529

Roll No:

BTECH
(SEM V) THEORY EXAMINATION 2025-26
DATABASE MANAGEMENT SYSTEM

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

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

Q no.	Question	CO	Level
a.	Explain Logical data Independence.	1	K1
b.	Write Advantages of Database.	1	K1
c.	Define Relational Algebra.	2	K1
d.	Define constraint and its types in DBMS.	2	K1
e.	Define 3 NF.	3	K1
f.	What is serializability in transaction processing systems?	4	K1
g.	Define Shared lock.	5	K1

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Discuss three level of abstractions or schemas architecture of DBMS.	1	K2
b.	Write difference between Cross Join, Natural Join, left outer join and right outer join with suitable example.	2	K2
c.	Consider R = (A, B, C, D, E, F, G, H) and F= { AB→ C, BC→ D, E → F, G → F, H → A, FG → H }. Is the decomposition of R into R1(A, B, C, D), R2(A, B, C, E, F), R3(A, D, F, G, H) lossless? Is it dependency preserving?	3	K3
d.	Define Transaction. Explain transaction property with detail and suitable example.	4	K2
e.	Explain the Validation Based protocol for concurrency control.	5	K2

SECTION C

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

a.	Compare Generalization, Specialization and Aggregation with suitable examples.	1	K3
b.	Draw an ER diagram of Hospital or Bank with showing the Specialization, Aggregation, Generalization. Also convert it in to relational schemas and SQL DDL.	1	K3

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

a.	Consider the following relational DATABASE. Give an expression in SQL for each following queries Underline records are Primary Key Employee (person_name, street, city) Works (person_name, Company_name, salary) Company (Company_name, city) Manages (person_name, manager_name) a) Finds the names of all employees who works for the ABC bank b) Finds the name of all employees who live in the same city and on the same street as do their managers c) Find the name street address and cities of residence of all employees who work for ABC bank and earn more than 7,000 per annum.	2	K 3

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	d) Find the name of all employee who earn more than every employee of XYZ. e) Give all Employees of corporation ABC a 7% salary raise . f) Delete all tuples in the works relation for employees of ABC. g) Find the name of all employees in this DATABASE who live in the same city as the company for which they work.		
b	Discuss the importance of domain constraints and key constraints in maintaining database consistency. Also explain Entity Integrity and Referential Integrity constraints with suitable examples.	2	K 3

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

a.	Short Notes of the Following- i) MVD or JD ii) Normalization with advantages	3	K 3
b.	Consider the universal relational schema R (A, B, C, D, E, F, G, H, I, J) and a set of following functional dependencies. F ={AB→C, A→DE, B→F, F →GH, D→IJ} Determine the keys for R? Decompose R into 2nd Normal Form.	3	K 3

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

a.	Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below. Draw the serializability (precedence) graphs for S1and S2 and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s). T1: r1(X); r1(Z); w1(X); T2: r2(Z); r2(Y); w2(Z); w2(Y); T3: r3(X); r3(Y); w3(Y); S1: r1(X); r2(Z); r1(Z); r3(X); r3(Y); w1(X); w3(Y); r2(Y); w2(Z); w2(Y); S2: r1(X); r2(Z); r3(X); r1(Z); r2(Y); r3(Y); w1(X); w2(Z); w3(Y); w2(Y);	4	K3
b.	Explain in details about ACID properties of transaction.	4	K2

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

a.	Discuss the complexities of recovery with concurrent transactions. Also explain the importance of the checkpoints mechanism in reducing the time required for recovery after a system crash.	5	K3
b.	Describe major problems associated with concurrent processing with examples. What is the role of locks in avoiding these Problems.	5	K2

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