Roll No. 2 2 6 1 5 1 4

BACK -End Semester Examination 2025

Name of the Course: BTech CSE

Semester: V t h

Name of the Paper: Database management System

Paper Code: TCS503

Time: 3 Hour's

Maximum Marks: 100

Note:

(i) All Questions are compulsory.
(ii) Answer any two sub questions among a,b and c in each main question.
(iii) Total marks in each main question are twenty.
(iv) Each question carries 10 marks.

Q1		(10 X2 = 20 Marks)	
(a)	Define data Independence in RDBMS. Differentiate between physical and logical data independence		CO1, CO2
(b)	Explain the three levels of database architecture.		
(c)	Explain the components of DBMS with a neat diagram.		
Q2		(10 X2 = 20 Marks)	
(a)	Discuss Functional dependencies and their role in normalization.		CO2, CO3
(b)	Explain JOINs in SQL with examples (INNER, LEFT, RIGHT, FULL).		
(c)	If two transactions access the same data but do not write to it, do we need concurrency control? Explain.		
		(10 X2 = 20 Marks)	

(b)	Explain JOINs in SQL with examples (INNER, LEFT, RIGHT, FULL).	CO2, CO2
(c)	If two transactions access the same data but do not write to it, do we need concurrency control? Explain.	
Q3	(10 X2 = 20 Marks)	
(a)	AB → C C → D D → A List the candidate keys of the relation.	CO3, CO4
(b)	Define integrity constraints. Differentiate between entity integrity and referential integrity.	
(c)	List the Armstrong Axioms for the functional dependencies. Explain with examples.	
Q4	(10 X2 = 20 Marks)	
(a)	For a relation R (A, B, C,D,E,F) with the FDs F= {AB→C, C→A, BC→D, ACD→B, BE→C, CE→FA, CF→BD D→E}. I. Describe and canonical cover for F. II. Write prime and non-prime attributes.	CO5

(b) Consider the following table Employee.

Emp_id	Emp_name	deptt.
101	Abhay	CSE
102	Binod	IT
103	Chirag	CSE
104	Devesh	CSE
105	Ena	IT
106	Faizal	MCA

Display output based on following query:
i. SELECT deptt,count(*) from Employee GROUP BY deptt.
ii.SELECT Emp_name from Employee where deptt. IN (SELECT deptt from Employee GROUP BY deptt having count(*)<2)

(c) Explain 3NF and BCNF. How 3NF is differentiate between BCNF.

Q5 **(10 X2 = 20 Marks)**

(a) Consider following relation:
Student (student_name,S_id, student_city)
Course (c_id, s_id, course_name, course_instructor)

CO4, CO5

Write SQL queries for the above relation:
i. Create STUDENT and COURSE table with s_id as primary key in student table.
ii. Create a foreign key using both tables.
iii. Display the name of instructor for student id 101 and 102.
iv. Display all courses enrolled by student with 205 id.
v. Count total number of students as TOTAL_NUMBER in each course

(b) T1: R(X) —— W(X)
T2: R(X) —— W(X)
T1: Commit
T2: Commit
Draw the precedence graph and determine if it is conflict serializable.

(c) Given two sets F1 and F2 of FD's for a relation (A, B, C, D, E,F)
F1: A→B, AB→C, D→C, D→E, E→F
F2: A→C, D→AE, D→F
Are F1 and F2 equivalent? Explain with appropriate Steps.