Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA– SEMESTER –III EXAMINATION –Summer-2019

Subject Code:4639303 **Date: 20-05-2019**
Subject Name: Database Management Systems
Time:02.30 pm to 5.00 pm **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define the following:	**07**
		1. Database	
		2. Metadata	
		3. Transaction	
		4. Entity	
		5. Prime Attribute	
		6. Domain	
		7. Candidate Key	
	(b)	Explain the Following in brief:	**07**
		1. Referential Integrity	
		2. Database Schema	
		3. Weak Entity Type	
		4. Multivalued Functional Dependency	
		5. Safe and Unsafe expression in Relational Calculus	
		6. Union Compatible operations in Relational Algebra	
		7. Cascading Rollback	
Q.2	**(a)**	Draw an ER Diagram for the Hospital Management System where multiple wards are there which are taken care by set of peoples like Nurses, word boys. Different types of specialist doctors are handling patient's cases. Some doctors available full time, some are visiting and some are doing internship. Office section will handle all staff and patients. Define all the entities and their attributes clearly along with the relationships. Also use the concept of Specialization/ Generalization wherever needed.	**07**
	(b)	Write Relational Algebraic forms for the following queries : EMP(SSID, Name, Salary, Supervisor_SSID, Dno, Address) DEPT(DeptNo, Name, Mgr_SSID ,Location) PROJECT(Pno, Dno, Location)	**07**
		1. Retrieve the name and address of all employees who works for IT Department.	**(01)**
		2. Display the department no, and its manager's name whose project is located at 'New Delhi'	**(03)**
		3. Find the name of employees who work on all the projects controlled by department no 3.	**(03)**

OR

	(b)	Write expression in Domain Relational Calculus for the following queries :	**07**

Teacher(ID, name, dept_name, salary, Course_name, Semester)
1. Find all teachers whose salary is greater than 40,000. **(01)**
2. Find the teachers of department 'Computer Science'. **(02)**
3. List the courses taught by the teachers of Semester-2. **(02)**
4. Find the department where course 'DBMS' is taught. **(02)**

Q.3 **(a)** Draw and explain database system environment **07**
(b) Compare specialization and generalization with appropriate example. **07**

OR

Q.3 **(a)** Explain three schema architecture and data independence **07**
(b) Explain degree of a relationship type and cardinality ratio for binary relationships. **07**

Q.4 **(a)** Explain Union Intersection and Minus operations of Relational Algebra. **07**
(b) Explain 3NF and BCNF and compare both with appropriate example. **07**

OR

Q.4 **(a)** Compare Cartesian product with Join Operation and find the difference between equijoin and natural join. **07**
(b) Decompose the following Relation upto 3NF. Also provide the explanation/ rules to convert from one normal form to another.
ORDER(order#, customer#, name, address, orderdate(product#, description, quantity, unitprice)) **07**

Q.5 **(a)** (i) List four problems occurred due to concurrently running transactions and concurrency control is needed for. **04**
(ii) Differentiate between deferred update and immediate update. **03**
(b) Write a short note on :
(i) ACID property of transaction **04**
(ii) Shadow Paging **03**

OR

Q.5 **(a)** Explain two phase locking technique for concurrency control. **07**
(b) What is serializable schedules? How to test serializability of a schedule? **07**

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