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PAPER CODE	U313-2102 (RE)

DECEMBER 2023 (RE EXAM)

TY (INFORMATION TECHNOLOGY) (SEMESTER - I)

COURSE NAME: DATABASE MANAGEMENT SYSTEMS

COURSE CODE: ITUA31202

(PATTERN 2020)

Time: [2 Hrs] **[Max. Marks: 60]**

Instructions to candidates:

1. **Figures to the right indicate full marks.**
2. **Use of scientific calculator is allowed**
3. **Use suitable data wherever required**
4. **All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5, and 6 respectively**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) For the database system to be usable, it must retrieve data efficiently. The need for efficiency has led designers to use complex data structures to represent data in the database. Developers hide this complexity from the database system users through several levels of abstraction. Explain those levels of abstraction in detail with example	[5]	1	3
	b) Explain the concept of candidate key and primary key, foreign key. Identify above listed key for the following schema: Person (driver_id, name, address, contactno) Car(licence, model, year) Owns (driver_id, licence)	[5]	1	3
	c) List the different components used in ER Diagram with their meaning and construct ER Diagram for car insurance companies whose customers own one or more cars each. Each car is associated with it zero to any recorded accidents. Each insurance policy covers one or more cars and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received.	[5]	1	3
Q.2	a) Consider the following schema: employee (employee-name, street, city) works (employee-name, company-name, salary) company (company-name, city) manages (employee-name, manager-name) i)Find all employees in the database who live in the same cities as the companies for which they work. ii)Find all employees in the database who live in the same cities and on the same streets as do their managers.	[5]	2	
	b) Consider the following schema: employee (employee-name, street, city) works (employee-name, company-name, salary) company (company-name, city) manages (employee-name, manager-name) i)Find all employees in the database who do not work for First Bank Corporation. ii)Find all employees who earn more than the average salary of all employees of their company.	[5]	2	

Q.2	c) Consider the following schema: employee (employee-name, street, city) works (employee-name, company-name, salary) company (company-name, city) manages (employee-name, manager-name) i)Find all employees in the database who live in the same cities as the companies for which they work. ii)Find the company that has the most employees.	[5]	2	4
Q3.	a) Explain Codd's any 5 rules with example b) Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, N} and the set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K, L}, K -> {M}, L -> {N} on R. Finding attribute closure of foll. A. {E, F} B. {E, F, H} C. {E, F, H, K, L} D. {E} c) Explain 4NF and 5NF normal form with example	[5] [5] [5]	3 3 3	3 3 3
Q.4	a) Explain a two phase locking protocol with examples and also mention its disadvantages. b) What is a transaction? Explain usefulness of Acid properties. c) What is a deadlock? Explain how deadlock detection and prevention is done	[5] [5] [5]	4 4 4	3 3 3
Q.5	a)Explain the Objective of Distributed Database Design on which it is recommended for use? b)What factors could result in skew when a relation is partitioned on one of its attributes by: a. Hash partitioning b. Range partitioning In each case, what can be done to reduce the skew? c)Consider a bank that has a collection of sites, each running a database system. Suppose the only way the databases interact is by electronic transfer of money between one another. Would such a system qualify as a distributed database? Why?	[5] [5] [5]	5 5 5	5 5 5
Q.6)	a) Explain CURD operations in NOSQL with example b) Draw and Explain Hadoop distributed file system c) Explain characteristics of Big Data and it's applications	[5] [5] [5]	6 6 6	3 2 3