NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
THEORY EXAMINATION

Question Paper

Month and Year of the Examination: **NOV/DEC-2019**
Programme: **B.Tech**/M.Tech/MBA/MCA Semester: **3rd Semester**
Subject: **- Database System**
Course No: **-ITPC -24** Maximum Marks: **- 50**
Number of Questions to be attempted: **-5** **Times** allowed: **3 Hours**
Total No. of Questions: **-5** Total No. of Pages used: **2**

Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any. The Candidates, before starting to write the solutions, should please check the question Paper for any discrepancy, and also ensure that have been delivered the question paper of right **course no**. and right **subject title**.

Note: - Attempt any five questions

1.	(a) Suppose that we have a relation **Marks (student-id, score)** and we wish to assign grades to students based on the score as follows: grade F if score < 40, grade C if 40 ≤ score < 60, grade B if 60 ≤ score < 80, and grade A if 80 ≤ score. Write SQL queries to do the following : **i.** Display the grade for each student, based on the marks relation. **ii.** Find the number of students with each grade.	5
	(b) List operations of relational algebra and purpose of each with example.	5
2.	(a) Explain ACID Properties ,lock based and timestamp based protocols with example.	5
	(b) What does the term *unnormalized relation* refer to? How did the normal forms develop historically from first normal form up to Boyce-Codd normal form?	5
3.	(a) Explain key constraints, Domain constraint, Referential constraint ,integrity constraint in detail. (b) Describe embedded and dynamic SQL. OR What is a minimal set of functional dependencies? Does every set of dependencies have a minimal equivalent set? Is it always unique?	5 5

4.	(a) Consider the relational **Company database**, where the primary keys are underlined. Give an expression in the **SQL** to express each of the following queries: **i.** .Find the names of all employees in this database who do not work for First Bank Corporation. **ii.** Find the names of all employees who earn more than every employee of Small Bank Corporation. **iii.** Assume the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located. **iv.** Find all employees who earn more than the average salary of all employees of their company. **v.** Find the company that has the most employees. **vi.** Find the company that has the smallest payroll. **vii.** Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.	5
	(b) Explain QBE, Domain and tuple relational calculus with example.	5
5.	Write short note on any two:- • Concurrency control • Database administration and data models • Comparison between candidate key, Foreign key and super key	10