

INDIAN INSTITUTE OF ENGINEERING SCIENCE AND TECHNOLOGY, SHIBPUR
B.TECH (5th sem) Mid-Semester EXAMINATION, 2023

Database Management Systems (CS3102)

F. M. = 30

Time – 2 hrs.

Answer all questions

✓ 1. Answer the following

- ✓ i) At which level(s) of three-schema architecture an End User and a DBA can interact?
- ✓ ii) Define physical and logical data independence.
- ✓ iii) Consider a hashed file organization where each bucket consists of one block. How many block accesses are required for look-up and deletion?
- ✓ iv) Consider an m-way B-tree. What is the minimum and maximum number of children of a node at intermediate level?
- ✓ v) Consider R and S are relations of arity r and s. Write the prerequisite(s) which needs to be fulfilled to compute $R \div S$.

[5x2]

✓ 2. Consider the following relational schema:

Students(rollno: integer, sname: string)
Courses(courseno: integer, cname: string)
Registration(rollno: integer, courseno: integer, percent: real)

Write the query 'Find the distinct names of all students who score more than 90% in the course numbered 107' in the following form:

- a) Relational Algebra
- b) Tuple relational calculus
- c) SQL

[3+4+3]

✓ 3. Draw the ER diagram and design the tables based on the following description:

Banks are identified by a name, code, address of head office. Banks have branches which are identified by a branch_no., branch_name, address. They have customers which are identified by name, cust-id, phone number, address. Customer may have one or more accounts having account_no., acc_type, balance. Customer can avail loans. Loans are identified by loan_id, loan_type and amount. Account and loans are related to bank's branch.

[10]

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