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Thapar Institute of Engineering and Technology (TIET), Patiala
Department of Electrical and Instrumentation Engineering

B.Tech. (EIC) (2022-23) MST	**Course Code**: UCS312 **Course Name**: Database Management System
March 06, 2023	Monday, 03:30 PM - 05:30 PM
Time: 2 Hrs, Max. Marks: 50 Weightage (25)	**Name of Faculty**: Dr. Rakesh Kr. Yadav

Note: All questions are compulsory. All parts of a question should be attempted in one place.

Q. 1 a) Explain the following terms with the help of examples. [6]
1. IS-A relationship
2. Generalization
3. Constraints in relational model

b) What is the difference between logical data Independence and physical data independence ? Which one is harder to achieve and state the reason for the same. [4]

Q. 2 A university database contains information about professors (identified by social security number SSN) and courses (identified by courseid). Professors also have a name, an address and a phone number. Courses have a name and a number of credits. Professors teach courses. For each of the following situations, draw a separate ER diagram (1 to 5) that describes it (assuming no further constraints hold). [5 x 2]
1. Every professor must teach some course.
2. Every professor teaches exactly one course.
3. Every professor teaches exactly one course and every course must be taught by some professor.
4. Modify the diagram from (1) such that a professor can have a set of addresses (which are street-city-state triples) and a set of phones.
5. Modify the diagram from (4) such that professors can have a set of addresses, and at each address there is a set of phones.

Q. 3 a) Consider the following database for a banking enterprise. The primary keys are Underlined and the data types are specified.

BRANCH(branch_name:string , branch_city:string , assets:real)
ACCOUNT(accno:int , branch_name:string , balance:real)
DEPOSITOR(customer_name:string , accno:int)
CUSTOMER(customer_name:string , customer_street:string , customer_city:string)
LOAN(loan_number:int , branch_name:string , amount:real)
BORROWER(customer_name:string , loan_number:int)

1. Create the above tables by properly specifying the primary keys and foreign keys. [5]
2. Enter at least three tuples for each relation. [3]
3. Find all the customers who have at least two accounts at the main branch. [2]
4. Find all the customers who have an account at all the branches located in a specific city [2]

b) Explain the 3-schema architecture with a diagram. [6]

Q. 4 a) Differentiate between that traditional file system and the DBMS approach . [4]

b) What is functional dependency? Explain the types of it with an example [4]

Q. 5 Convert the given ER diagram to relational scheme [6]