

Consider the following table :

10

Employee_name	Project_name	Dependent_name
Mohan	X	Shyam
Mohan	Y	Ram
Mohan	X	Ram
Mohan	Y	Shyam

Identify the multivalued dependencies in the above table and write an SQL code to check whether the table satisfies the multivalued dependency identified by you.

Why is the functional dependency called so ?

Consider the following functional dependency :

if you study \rightarrow you will pass

Create instances where this functional dependency will hold/not hold.

12

Consider the universal relation

$R = \{A, B, C, D, E, F, G, H, I, J\}$ and a set of functional dependencies.

$$F = \left\{ \begin{array}{l} AB \rightarrow C \\ A \rightarrow DE \\ F \rightarrow GH \\ D \rightarrow IJ \end{array} \right\}$$

Decompose R into BCNF.

10

What is multivalued dependency ? How is 4NF related to multivalued dependency ? Is 4NF dependency preserving in nature ? Justify your answer.

4

Consider the following relation R (A, B, C) :

5

R

A	B	C
1	2	3
4	2	3
5	3	3
5	3	4

Which of the following dependencies does not hold ? Give reasons.

(i) $A \rightarrow B$

(ii) $A \twoheadrightarrow B$

Explain Join Dependency with the help of an example. To which normal form does it correspond ? Functional dependencies and multivalued dependencies are special type of Join dependencies. Justify. 10

Give an example of MVD. Prove how your MVD can act as a functional dependency. 6

List all the functional dependencies satisfied by the following relation :

A	B	C
a ₁	b ₁	c ₁
a ₁	b ₁	c ₂
a ₂	b ₁	c ₁
a ₂	b ₁	c ₃

Write an SQL-Code to identify whether a given functional dependency holds. 7

Determine all 4NF violations for the relation 6
 schema R(X, Y, Z, W) with multivalued dependencies $X \twoheadrightarrow Y$ and $X \twoheadrightarrow Z$.
 Decompose the relation into 4NF.

State 3NF and BCNF. Explain their 6
 difference with the help of examples.

Define Multi-valued dependencies and Join 6
 dependencies. Give an example of each.
 State fourth and fifth normal form.

Consider a relation R (A, B, C) with 4
 functional dependencies $AB \rightarrow C$ and
 $C \rightarrow A$. Decompose the relation R into
 BCNF relations.

Describe normalization using join 6
 dependency with the help of an example.

Which MVDs (multivalued dependency) 5
hold for the following table :

P-No.	Colour	Size
P ₁	C ₁	S ₁
P ₁	C ₂	S ₁
P ₁	C ₁	S ₂
P ₁	C ₂	S ₂
P ₁	C ₁	S ₃
P ₁	C ₂	S ₃
P ₂	C ₃	S ₁
P ₂	C ₃	S ₃

Each product (P) comes in a range of
colours (C) and sizes (S)

What is a join dependency ? Explain with 5
an example. When a join dependency is
referred as trivial ?

Consider a small institute in which students 5
register for programmes run by the institute.
A program can be a full or a part time
program or both. Every student necessarily
registers in at least one programme and
at most three programme. Assuming
suitable attributes, design an EER diagram
for the same.

The organization called ABC undertakes 10
several kinds of projects. Each employee
can move on one or more projects. Each
project is undertaken on the request of a
client. A client can request for several
projects. Each project has only one client.
A project can use a number of items from
different manufacturers and an item may
be used by several projects. Before delivery
of items to a client, it is tested by testing
group in the organization.

Draw an E-R diagram and convert it into a
relational schema. Also identify primary key
in each relation.

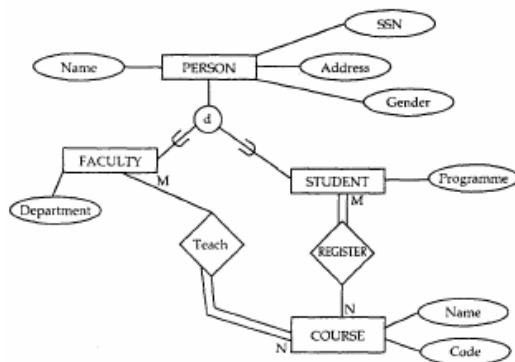
Consider the following requirements :

5

A car or truck can be a registered-vehicle. A person, bank or company can own a registered vehicle. Model this requirement using EER diagram.

The ABC Bank offers five types of Accounts : loan, checking, savings, daily interest saving and money market. It operates a number of branches within the country. A client of the bank can have any number of accounts. Accounts can be self or a joint account.

- (i) Draw an EER diagram for the ABC bank identifying various entities, attributes and cardinality. Show meaningful relationships that exist among the entities.
- (ii) Translate the EER diagram to schema
- Relational Model.**
- (b) Consider the following EER Diagram 5



Derive relations from the above EER diagram.

Design a generalization specialization hierarchy for a motor vehicle sales company. The company sells motorcycles, passenger - cars, vans and buses. Justify your placement of attributes at each level of the hierarchy.

5