Question Paper

Exam Date & Time: 11-Jun-2022 (02:00 PM - 05:00 PM)

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

FOURTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, JUNE 2022

DATABASE SYSTEMS [ICT 2271]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates:
Answer ALL questions Missing data may be suitably assumed

1) Write the SQL query for the following problems using the schema given in Figure Q.No. 1. (5)

A) i. Display those departments where the average salary of the department is more than the average salary of all the instructors' considering all the departments.

ii. Retrieve student name, total credit, his/her department name and average credit of the department, provided the average credit of his/her department is more than the average credits of 'I&CT' department. (Without using group by and having clause).

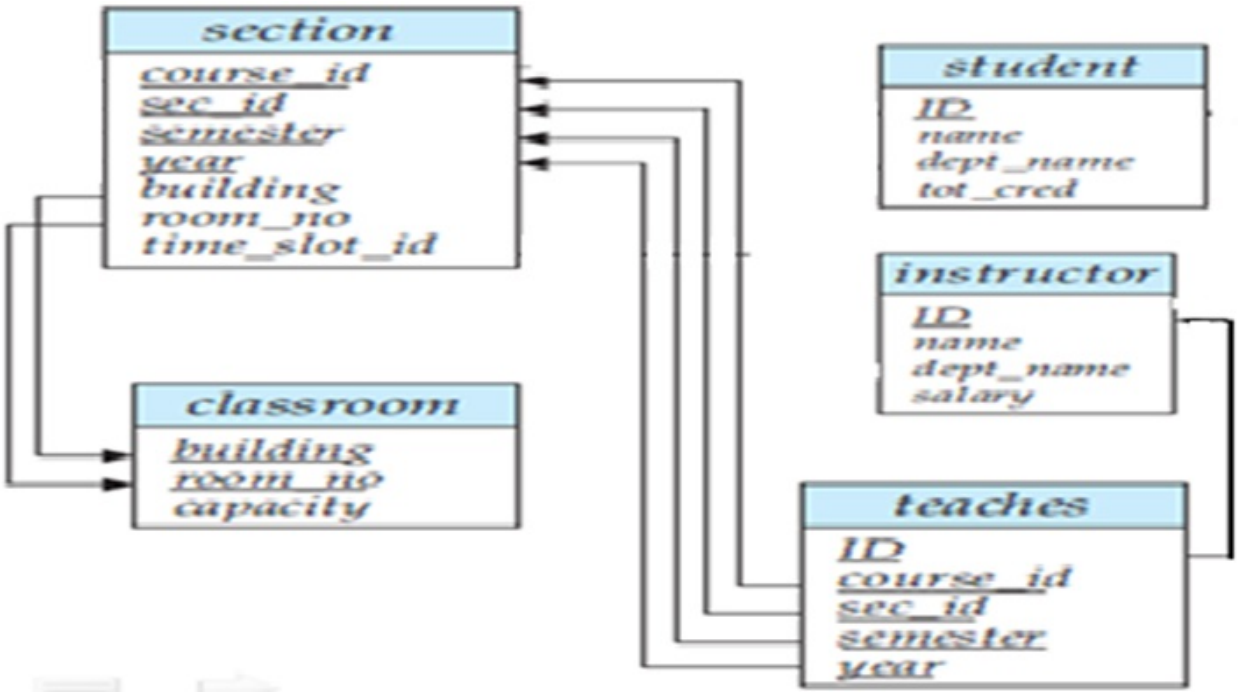

Figure Q.No. 1

B) Showing all the steps clearly, keep the following universal table R into a highest normalized form. R(ABCDEFGHIJ), with FDs AB-->C, A-->DE, B-->F, F-->GH, D-->IJ (3)

C) Consider the following set F of functional dependencies on the relation schema R (A, B, C, D, E, F) and F= (A→BCD; BC→DE; B→D; D→A) . Compute a canonical cover (minimal cover) for the above set of functional dependencies F; give each step of your derivation with an explanation. (2)

2) i. Consider the database of an online bookstore. (5)

A) Every book has a title, isbn, year and price. The store also keeps the author and publisher for any book. For authors, the database keeps the name, address and the url of their homepage. For publishers, the database keeps the name, address, phone number and the url of their website. The store has several warehouses, each of which has a code, address and phone number. The warehouse stocks several books. A book may be stocked at multiple warehouses. (In previous sentence, we are not referring to a particular copy of the book. Consider for example "the complete book" for our course. This book may be stocked at multiple warehouses.) . The database records the number of copies of a book stocked at various warehouses. The bookstore keeps the name, address, email-id, and phone number of its customers. A customer owns several shopping basket. A shopping basket is identified by a basketID and contains several books. Some shopping baskets may contain

more than one copy of same book. The database records the number of copies of each book in any shopping basket. Design an ER diagram for such a bookstore.

ii. Represent the ER diagram given in Figure Q. No. 4 to relational model (Set of tables).

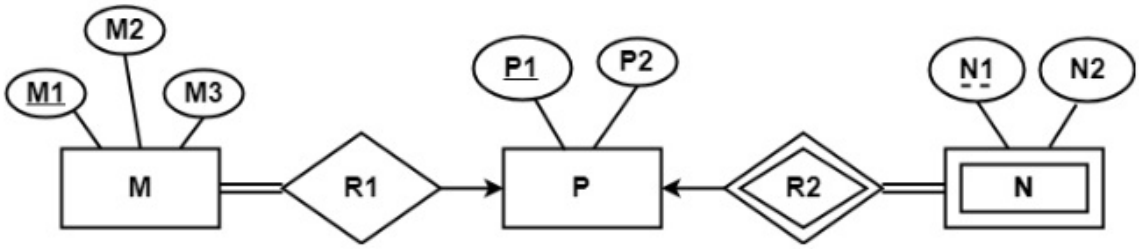

Figure Q. No. 4

B) How do you describe relationship between relationships in database design? Explain with an appropriate example and describe the advantages. (3)

C) List all the candidate key for the R(ABCDEFGH) with the following functional Dependencies. F = {CH -> G, A -> BC, B -> CFH, E -> A, F -> EG}. (2)

3) Answer the following using Schema given in Q.No.1. (5)

A)
i. Write a trigger to carry out the following action: On delete of an instructor, insert all the sections taught by the instructor into a log table. Assume log table schema same as the section table.

ii. Retrieve the sections that are taught by at least one instructor from 'I&CT' department and having the class room capacity more than 60. (only using exists Clause).

B) With suitable example mention the similarity and difference between the Wait-die and Wound-wait schemes. (3)

C) Compare and contrast view and conflict serialization. (2)

4) Given a relation R (P, Q, R, S, T, U, V, W, X, Y) and Functional Dependency set FD = {PQ → R, PS → VW, QS → TU, P → X, W → Y}, determine whether the given R is in highest normal form ? If not convert it. (5)

A)

B) Explain with suitable example the pros and cons of Timestamp based protocol. (3)

C) Explain the working of the conflict serialization with the suitable example. (2)

5) Consider the INVOICE table structure with sample invoice records given below: (5)

A)

ATTRIBUTE NAME	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE
INV_NUM	211347	211347	211347	211348	211349
PROD_NUM	AA-E3422QW	QD-300932X	RU-995748G	AA-E3422QW	GH-778345P
SALE_DATE	15-Jan-2016	15-Jan-2016	15-Jan-2016	15-Jan-2016	16-Jan-2016
PROD_LABEL	Rotary sander	0.25-in. drill bit	Band saw	Rotary sander	Power drill
VEND_CODE	211	211	309	211	157
VEND_NAME	NeverFail, Inc.	NeverFail, Inc.	BeGood, Inc.	NeverFail, Inc.	ToughGo, Inc.
QUANT_SOLD	1	8	1	2	1
PROD_PRICE	$49.95	$3.45	$39.99	$49.95	$87.75

Write the relational schema, draw its dependency diagram and identify all dependencies, including all partial and transitive dependencies. Identify the normal forms for each table structure you created

Assume:

a. The table does not contain repeating groups

b. Any invoice number may reference more than one product.

B) With suitable example explain the pros and cons of validation-based protocol. (3)

C) Explain the limitation of the NoSQL. (2)

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