Question Paper

Exam Date & Time: 08-Jul-2023 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B.TECH. DEGREE EXAMINATIONS - JUNE/JULY 2023
SUBJECT: CSE 2251/ CSE-2251 DATABASE SYSTEMS
(COMPUTER SCIENCE AND ENGINEERING - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING / COMPUTER SCIENCE / COMPUTER SCIENCE AND ENGINEERING - CYBER SECURITY)

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

Answer all the questions.

1A) For the given relation schema, (5)
Employee(EID, ename, salary)
Works_for(CID, Company_name, address, EID)
i) Identify the attributes which could be used as super key, candidate key, primary key and foreign key with appropriate justifications.
ii) Find out the relational algebra expression to list names of employees who work for company named 'Google'.

1B) Differentiate between the different types of data models used in database applications. (3)

1C) Classify various kinds of transaction failures occur in database systems along with suitable examples. (2)

2A) Suppose the Instructor records are stored in a file as shown in Figure 2A. Consider Record 5 is deleted. Compare the relative merits and demerits of the following techniques for implementing the deletion with suitable justifications: (5)
i) Move record 6 to the space occupied by record 5, and move record 7 to the space occupied by record 6.
ii) Move record 7 to the space occupied by record 5.
iii) Mark record 5 as deleted, and move no records.

record 0	10101	Srinivasan	Comp. Sci.	65000
record 1	12121	Wu	Finance	90000
record 2	15151	Mozart	Music	40000
record 11	98345	Kim	Elec. Eng.	80000
record 4	32343	El Said	History	60000
record 5	33456	Gold	Physics	87000
record 6	45565	Katz	Comp. Sci.	75000
record 7	58583	Califieri	History	62000
record 8	76543	Singh	Finance	80000
record 9	76766	Crick	Biology	72000
record 10	83821	Brandt	Comp. Sci.	92000

Figure 2A.

2B) "We can convert any weak entity set to a strong entity set by simply adding appropriate attributes" - Justify your answers with suitable reasons. Then, why Weak entity sets are used in database design? (3)

2C) How to create an Index on an attribute of a given relation in SQL. Illustrate with syntax and suitable (2)

example.

3A) Consider the following **Sales Management** schema: (5)

Suppliers(sID, sName, address)
Parts (pID, pName, colour)
Catalog (sID, pID, price)

Table 3A. Sales Management Schema

Write the following SQL queries:

i) Find the name and ID of the suppliers whose address contains 'Manipal'. Sort the records in alphabetical order of their name, if two suppliers have same name then sort them in descending order of ID.

ii) Compute the suppliers name and ID who have sold the part with ID 10 at a price more than that supplied by supplier with ID 2.

iii) Find the supplier IDs who sold the part with ID 123 at a price more than its average selling price.

iv) Calculate the IDs of parts whose price is in the range of 500 and 1000. Eliminate duplicates from resulting relation.

v) Using appropriate SQL set operations, find all the suppliers who supplied blue coloured parts but their address did not contain 'Manipal'.

3B) How lossy decomposition is achieved during database normalization process? Illustrate with suitable examples. (3)

3C) For the **Sales Management** schema in Table 3A. , write the following SQL queries: (2)

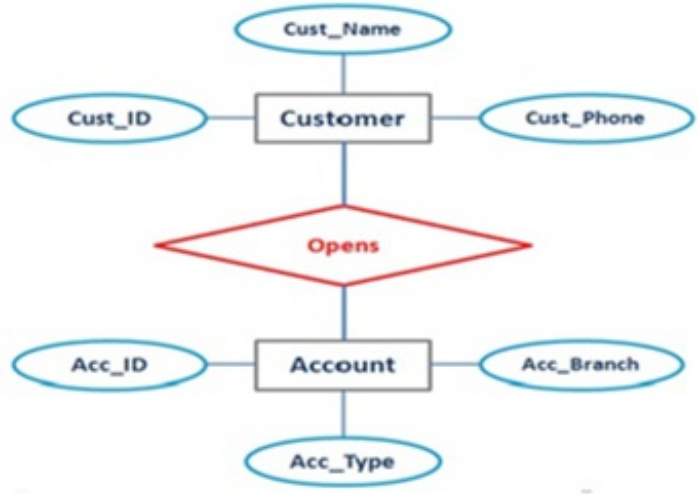
i) Find all the parts that were supplied by all the suppliers who supplied the part with ID 123.

ii) Update the price of the blue coloured parts such that those priced at 500 and above receive 30% increase whereas others receive a 50% increase.

4A) From the given Bank-schema find out i) the Primary key ii) if both the tables are connected then for updating the data which command needs to be used. iii) if both the tables are connected then for the deletion of the data which command needs to be used. (5)

iv) Design the DDL commands for customer entities using SQL.

v) Design the DDL commands for account entities using SQL.



4B) (i) Find the candidate key for R(A,B,C,D,E,F), F={AB→C, C→D, B→AE}. (3)

(ii) Compute the functional dependencies for the following R

1) A→BC, 2) DE→C, 3) C→DE 4) BC→A

A	B	C	D	E
a	2	3	4	5
2	a	3	4	5
a	2	3	6	5
a	2	3	6	6

(1+2 = 3 marks)

4C)	Consider Online Retail Applications used in supermarkets such as Vishal Mega Mart: Identify at least three entities and the association between them.	(2)
5A)	R(ABCDEFGHIJ) F={AB→C, A→DE,B→F, F→GH, D→IJ} i) This relation carries which normal form justify ii) If it is not in BCNF then convert it into BCNF. iii) Also justify whether the relation is lossless or not. iv) Also justify whether the relation is having dependency preservation decomposition or not.	(5)
5B)	Find out canonical cover of F={A→BC, CD→E,E→C,D→AEH, ABH→BD, DH→BC}	(3)
5C)	Justify is this schedule conflict serializable or not?	(2)

T1	T2
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R(A)	
	R(A)
	R(B)
	W(B)
R(B)	
W(A)	

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