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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

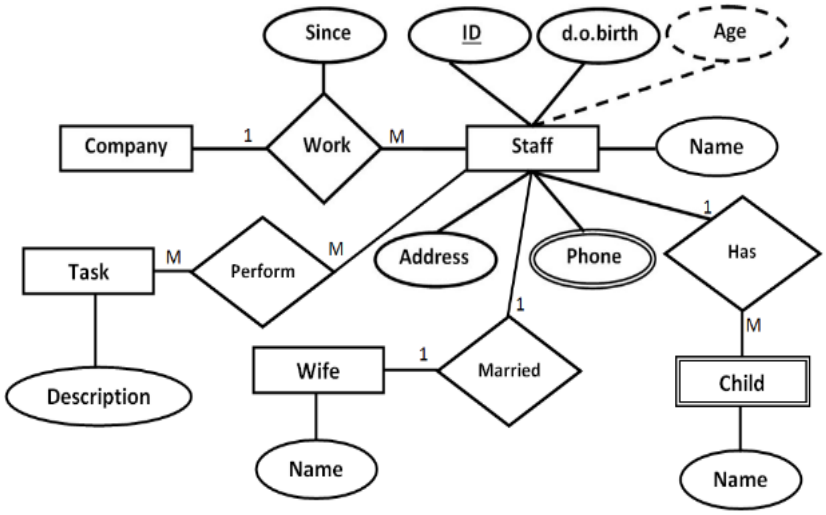
Programme: B.E **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 19IS4PCDBM **Max Marks: 100**
Course: Database Management System **Date: 19.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Convert the below ER model to relational model with appropriate sequence of steps neatly explained. **10**



b) Construct an ER diagram representing entities, attributes, key attributes and multiplicity for a Blood Bank System with the following requirements: **10**

- A Blood Bank stores blood of various blood groups. A donor is identified by a donor id, name, sex, age, address and phone number.
- The blood donated by the donor is characterized by blood type, code and cost.
- Before each donor donates his blood, he is required to register himself as a donor with the receptionist who works at the Blood Bank.
- The receptionist is identified by employee id, name, address, email_id and phone number.
- The Blood Banks receives orders for blood from many hospitals. The hospitals are identified by name, address and phone number.
- Each blood bank has its own blood bank number, issues, orders and blood types stored.

- The Blood Bank is managed by the blood bank manager who is identified by employee id, name, address, email_id and phone number. He is responsible for the proper management of the blood bank.

UNIT - II

2 a) Consider the relational database, where the keys are underlined. **08**

Employee (person_name, street, city)
Works (person_name, company_name, salary)
Company (company_name, city)
Manages (person_name, manager_name)
Construct the following SQL queries for the relational database.

i) Find the names of all the employees who works for a company with their salary.
ii) Find the names of all employees who live in the same city and on the same street as do their managers.
iii) Find the names, street address and cities of residence of all employees who work for a company and earn more than 10000per annum.
iv) Find the names of all employees in their database who live in the same city as the company for which they work.

b) Differentiate with an example Nested Query and Correlated Query. **06**

c) For the given tables, give example of Equi join, Theta join, Natural join and explain the same. **06**

Table A

A	B	C
1	2	3
2	6	7
3	8	9
4	5	6

Table B

A	X	Y
1	4	5
4	5	6
7	8	9
2	9	5

OR

3 a) Given the Relations schema, **10**

SUPPLIER(sid: integer, sname: string, address: string)
PART(pid: integer, pname: string, color: string)
CATALOG(sid: integer, pid: integer, cost: real)
Write Relation Algebra for the given Queries :

i) Find the names of suppliers who supply some red part.
ii) Find the IDs of suppliers who supply some red or green part.
iii) Find the IDs of suppliers who supply some red part and are based at Bangalore.
iv) Find the IDs of suppliers who supply some red part and some green part.
v) Find the supplier id and names of suppliers who are based in Chennai.

b) Illustrate with an example i) Bag Union ii) Bag Intersection iii) Bag Difference **06**

c) Create a view of an Employee table assuming necessary attributes and conditions. Discuss the need for views. **04**

UNIT - III

4 a) Differentiate between RDBMS and NoSQL. **06**

b) Discuss any two different storage types in NoSQL **06**

c) Perform the following operations using MongoDB **08**

i) Create a collection that contains details of library books.

ii) Insert three documents in the collection, each document contains fields B_ID, B_Name, B_Author, B_Amount.

iii) Display all the information in the collection.

iv) Display the documents where the author name is "GKS" and cost of the book is greater than 500Rs.

v) Delete the documents with B_Name "C Programming"

vi) Display the total number of documents in the collection.

vii) Display only the second document in the collection.

viii) Update the document which contains B_ID 10.

UNIT - IV

5 a) With an example, differentiate between trivial and nontrivial functional dependencies. **06**

b) Given a relation R with attributes A,B,C,D,E. The relation has FD:{A -> B, B -> D, C -> DE, CD -> AB} **08**
Find the closure of A^+, C^+, AB^+, ABD^+.

c) Justify the need for Normalization of data with an example. **06**

OR

6 a) Given the Relational Table. Identify the anomalies it can lead to and provide a solution to avoid the anomalies. **06**

Sid	Sname	Credits	Dept	Building	Room No
1	Ram	5	CSE	B1	101
2	Rahul	8	CSE	B1	101
3	Raju	8	EC	B2	201
4	Rohan	9	EC	B2	201
5	Raj	10	ME	B3	301

b) Find at least *three* FDs which hold on this instance **04**

A	B	C	D	E
1	2	4	3	6
3	2	5	1	8
1	4	4	5	7
1	2	4	3	6
3	2	5	1	8

c) Consider the Relation R with attributes A, B, C, D and having functional dependencies **10**

i $A \rightarrow B$
ii $B \rightarrow C$
iii) $C \rightarrow D$

Compute the closure of the attributes: { A }+ , { B }+ , { C}+ ,{ D }+ , { AB}+ .Find the candidate key and super key and justify your answers)

UNIT - V

7 a) Give the schedule below. Is it possible to convert it to a serial schedule? If yes neatly give the steps for the conversion. **06**

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

b) Check whether the given schedule is conflict serializable or not by clearly explaining the steps **08**

S : $R_1(A)$, $R_2(A)$, $R_1(B)$, $R_2(B)$, $R_3(B)$, $W_1(A)$, $W_2(B)$

S : $R_1(X)$, $R_1(Y)$, $W_2(X)$, $R_3(X)$, $W_1(Y)$, $W_3(X)$, $R_2(Y)$, $W_2(Y)$

c) Illustrate with an example how two-phase locking ensures serializability. **06**

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