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

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 22AM3PCDBM **Max Marks: 100**
Course: Database Management Systems

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

UNIT - I

1 a) Discuss the significance of an assertion. Write an assertion to specify a constraint such that the salary of an employee must not be greater than the salary of the manager of the department that the employee works for in SQL. **10**

b) Consider the relational table given below and assess about the following SQL queries. **10**

Employee (Empno, Name, Department, Salary).

(i) List the employees whose jobs same as SMITH or ALLEN
(ii) Any jobs of deptno 10 those that are not found in deptno 20
(iii) List the employees who are senior to most recently hired employee working under king.
(iv) Find the highest paid employee of sales department.
(v) Find all the employees who earn the minimum salary for each job wise in ascending order.

OR

2 a) Demonstrate creation and deletion of views in DBMS. Create a view which will display the department name, number of employees and the total salary for each department. **10**

b) Consider the relational table given below and assess about the following SQL queries. **10**

Employee (Empno, Name, Department, Salary).

(i) Find out all the employees who earn highest salary in each job type. Sort in descending salary order.
(ii) List the Number of employees and Avg salary within each department for each job.
(iii) List the Department number and their average salaries for dept with the average salary less than the averages for all department.

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.

(iv) List out the Names and Salaries of the employees along with their manager names and salaries for those employees who earn more salary than their manager.

(v) List the details of most recently hired employees of dept 30.

UNIT – II

3 a) Design an ER-diagram for the movie database considering the following requirements: **10**

(i) Each movie is identified by its title and year of release, it has length in minutes and can have zero of more quotes, language.

(ii) Production companies are identified by name, they have address, and each production company can produce one or more movies.

(iii) Actors are identified by name and date of birth; they can act in or more movies and each actor has a role in a movie.

(iv) Directors are identified by name and date of birth, so each director can direct one or more movie and each movie can be directed by one or more directors.

(v) Each movie belongs to any one category like horror, action, drama etc.

b) Illustrate the following with an example: **10**

(i) Weak entity type

(ii) Participation constraints

(iii) Cardinality ratio

(iv) Ternary relationship

(v) Recursive relationship

UNIT - III

4 a) Consider the database given below and answer the following queries: **10**

Lives (person-name, street, city)
Works (person-name, company-name, salary)
located-in (company-name, city)
manages (person-name, manager-name)

(i) Find all tuples in works of all persons who work for the City Bank company (which is a specific company in the database).

(ii) Find names of all persons who live in the same city and on the same street as their manager.

(iii) Find the name and city of all persons who work for City Bank and earn more than 50,000.

(iv) Find the name of all persons who work for City Bank and live in DC.

(v) Find names of all persons who do not work for HDFC Bank and lives in Bangalore.

b) Discuss the characteristics and notations of a relation, with an example **10**

UNIT - IV

5 a) State and Elaborate the normal form is based on transitive functional dependency with an example. **10**

b) Consider the database given below: **10**

Booktitle	Authname	Booktype	Listprice	Affiliation	Publication

FDS{ Booktitle→ Booktype, publication
Authname→ Affiliation
Booktype → Listprice }.

Find the candidate keys and highest normal form. Normalize the relation accordingly.

UNIT - V

6 a) Explain schedules, serial, non-serial and conflict Serializable schedule with an example for each. **8**

b) Consider a database for a bank where the database system uses snapshot isolation. Describe a particular scenario in which a non-serializable execution hour that would present a problem for the bank. **6**

c) Explain properties of a transaction with state transition diagram. **6**

OR

7 a) Discuss the problems that can occur when concurrent transactions are executed and give examples for each. Justify the need of concurrency in transactions. **10**

b) The definition of a schedule assumes that operations can be totally ordered by time. Consider a database system that runs on a system with multiple processors, where it is not always possible to establish an exact ordering between operations that executed on different processors. However, operations on a data item can be totally ordered. Does this situation cause any problem for the definition of on it serializability? Explain your answer **5**

c) Consider the following two transactions and schedule (time goes from top to bottom). Is this schedule conflict-serializable? Explain why or why not. **5**

Transaction T_0	Transaction T_1
$r_0[A]$	
$w_0[A]$	
	$r_1[A]$
	$r_1[B]$
	c_1
$r_0[B]$	
$w_0[B]$	
c_0	

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