U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS4PCDBM **Max Marks: 100**
Course: Database Management System

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	CO	PO	Marks
1	a)	With a neat diagram, explain the component modules of database management system and their interactions.	CO1		10
	b)	Design an ER diagram for banking database. Specify the requirement assumed and accordingly represent the entities (minimum 5 entities) attributes the cardinality ratio and participation constraints.	CO2	PO1	10
		UNIT - II			
2	a)	With an example, discuss any three characteristics of a relation.	CO1		6
	b)	Identify the need for virtual tables in SQL with an example.	CO1		4
	c)	Consider the following relational schema: Lives (person-name, Streets, city, pid, cityid) Works (person-name, company-name, salary, pid, cityid) Located-in(company-name, manger-name,citypid) Manages (person-name, manager-name, pid, mid) Provide the SQL queries for the following: i) Find the names of all employees who work for the city bank company ii) Find the name, street and city of all employee who work for city bank and earn more than $10000 iii) Find all employees who live in the same city as the company they work for iv) Find all persons who do not work for city bank v) Find names of all companies which have(atleast one)employee living in the city that the company is located in	CO3	PO2	10
		UNIT - III			
3	a)	What is the purpose of Cartesian product in relational algebra? Consider the following relational database schema consisting of the four relation schemas:	CO3	PO2	10

<table>
<tr><td></td><td></td><td></td><td>Emp (Fname, Lname, SSN, DNo)

Dept (Dname, DNum, Mgr_SSN)
D_Loc (DNo, Location)
Project (PName, Pno, DNo, P_Loc)
Works_on (ESSN, PNo, Hours)
Formulate the following queries in Relational Algebra operations:
i. Retrieve the names of all employees who work for ‘Headquarters’ department.
ii. For every project located in ‘Stanford’, list the project number, controlling department and the manager’s name.
iii. Find the names of the employees who work on all the projects controlled by DNo=3.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>b)</td><td>Illustrate the working of division operation with an appropriate example.</td><td>CO2</td><td>PO1</td><td>6</td></tr>
<tr><td></td><td>c)</td><td>Discuss in brief any four characteristics of NOSQL systems.</td><td>CO1</td><td></td><td>4</td></tr>
<tr><td></td><td></td><td>UNIT - IV</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td>a)</td><td>Illustrate insertion and deletion anomalies with an example.</td><td>CO2</td><td>PO1</td><td>6</td></tr>
<tr><td></td><td>b)</td><td>Given a relation R(P,Q,R,S,T,U,V,W,X) and functional dependency set
FD = { PQ→R, QS→TU,PS→VW and P→ X}, DETERMINE given r is in which normal form?</td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td>c)</td><td>With an example, differentiate BCNF and 3NF.</td><td>CO2</td><td>PO1</td><td>4</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>5</td><td>a)</td><td>Identify the candidate keys, super keys, prime and non prime attributes for the given relation R (A, B, C, D) and Functional dependency is {AB→CD, D→B, C→A}</td><td>CO3</td><td>PO2</td><td>6</td></tr>
<tr><td></td><td>b)</td><td>Define Functional dependency. Determine all the Functional dependencies existing in the given relation.
<table><tr><th>ROLL NO</th><th>NAME</th><th>MARKS</th></tr><tr><td>1</td><td>A</td><td>78</td></tr><tr><td>2</td><td>B</td><td>60</td></tr><tr><td>3</td><td>A</td><td>78</td></tr><tr><td>4</td><td>B</td><td>60</td></tr><tr><td>5</td><td>C</td><td>80</td></tr></table></td><td>CO2</td><td>PO1</td><td>4</td></tr>
<tr><td></td><td>c)</td><td>Identify the need for normalization. Explain with example Second and Third Normal Forms.</td><td>CO2</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td></td><td>UNIT - V</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>a)</td><td>What are transaction processing systems? Illustrate with an example the problems that occurs when there is access to same database record in an uncontrolled manner.</td><td>CO2</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Differentiate between serial schedule and serializable schedule.</td><td>CO2</td><td>PO1</td><td>5</td></tr>
<tr><td></td><td>c)</td><td>Illustrate the State transition diagram representing the states for transaction execution.</td><td>CO1</td><td></td><td>5</td></tr>
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			OR			
	7	a)	Provide the significance of two phase locking and how does it ensure serializability.	***CO2***	***PO1***	**10**
		b)	List and discuss the desirable properties of transactions.	***CO1***		**5**

		c)	Which of the following schedules is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules and provide the justification for each.
			a) r1(X); r3(X); w1(X); r2(X); w3(X);
			b) r3(X); r2(X); w3(X); r1(X); w1(X);
				CO3	***PO2***	**5**

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