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K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)
End Semester Exam
May-June 2022

(B.Tech) Program: Artificial Intelligence & Data Science
Examination: SY Semester: IV

Course Code: 1UAIC403
Duration: 03 Hours

Course Name: Database Management System
Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	SQL tables cannot have duplicate rows inserted in them. Give reason	2	4	Analyze
ii)	Refer to the query given, point out the error: SELECT ID, name, dept_name, salary * 1.1 WHERE instructor;	2	4	Apply
iii)	List some of the DCL commands	2	4	Remember
iv)	What is the purpose SQL 'as' clause?	2	4	Understand
v)	What are virtual tables in SQL?	2	4	Remember
vi)	What is the process of defining subclasses of a superclass?	2	2	Understand
vii)	It is given for attributes X, Y of relational schema R as X --> Y ,This means:	2	5	Understand
viii)	What are the conditions for 2NF?	2	5	Remember
Q.2	Solve any four questions out of six.	16		
i)	Explain generalization and specialization with respect to EER model	4	3	Understand
ii)	Explain mapping cardinality with examples.	4	2	Understand
iii)	Explain with example, the DDL commands CREATE, ALTER and DROP.	4	4	Understand
iv)	What is a trigger? What is it used for?	4	4	Understand
v)	Give an example to illustrate the need of normalization.	4	5	Understand
vi)	What is a recoverable schedule? Explain with an example.	4	6	Understand

Q.3	Answer any two out of three:	16																				
i)	<p>Consider the bank database: The bank is organized into branches. Each branch is located in a particular city and is identified by a unique name. The bank monitors the assets of each branch. Bank customers are identified by their customer_id value. The bank stores each customer's name, the street and the city. Customers may have accounts and can take out loans. The bank offers two types of accounts: Saving and Checking account. Accounts can be held by more than one customer and a customer can have more than one account. Each account is assigned a Unique Account Number. In addition, each savings account has interest rate and overdrafts are recorded for each checking account. The bank provides its customers with loans. A loan originates at a particular branch and can be held by one or more customers. A loan is identified by Unique Loan Number. For each loan, the bank keeps track of loan amount and loan payments. Bank employees are identified by their employee_id values. The bank administration stores the name and telephone number of each employee, the names of the employee's dependents and the employee_id of the manager. The bank also keeps track of the employee's start date and thus length of employment.</p> <p>Draw ER diagram for the above database. Show clearly following things in ER diagram:</p> <ol style="list-style-type: none"> 1) Mapping cardinalities 2) Weak/ Strong Entity (if any) 3) Relationship Set 4) Primary Key. 	8	2	Apply																		
ii)	<p>1) What do you mean by "Conflict Serializable Schedule"?</p> <p>2) State whether following table is conflict serializable with justification.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">T1</th> <th style="width: 50%;">T2</th> </tr> </thead> <tbody> <tr> <td>Read (A)</td> <td></td> </tr> <tr> <td>Write (A)</td> <td></td> </tr> <tr> <td></td> <td>Read (A)</td> </tr> <tr> <td></td> <td>Write (A)</td> </tr> <tr> <td>Read (B)</td> <td></td> </tr> <tr> <td>Write (B)</td> <td></td> </tr> <tr> <td></td> <td>Read (B)</td> </tr> <tr> <td></td> <td>Write (B)</td> </tr> </tbody> </table>	T1	T2	Read (A)		Write (A)			Read (A)		Write (A)	Read (B)		Write (B)			Read (B)		Write (B)	8	6	Apply
T1	T2																					
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iii)	Describe constraints related to the primary key, foreign key, domains and NULLs	8	4	Understand																		
Q.4	Solve any two questions out of three.	16																				
i)	Draw the state diagram for a transaction. Discuss every state in brief with the help of an example	8	6	Understand																		

ii)	<p>Consider the following database: Product (maker, model, type) PC (model, speed, RAM, HD, price) Laptop (model, speed, RAM, HD, screen, price) Printer(model, color, type, price)</p> <p>The Product relation gives the manufacturer, model number and type (PC, Laptop or Printer) of various products. We assume for convenience that model numbers are unique over all manufacturers. The PC relation gives for each model number, the speed (of the processor in GHz), the size of RAM (in megabytes), the size of the hard disk (in gigabytes) and the price.</p> <p>Write SQL queries for the following (Any four)</p> <ol style="list-style-type: none"> Find the model number, speed and hard drive capacity for all the PCs with prices below \$500. Find the makers of PCs with a processor speed of 450 MHz or more. Find the average speed of the PCs produced by maker A. Find the makers producing at least three distinct models of PCs. Result set: maker, number of PC models Get the laptop models that have a speed smaller than the speed of any PC. Result set: type, model, speed 	8	4	Apply
iii)	<p>Design a generalization – specialization hierarchy for a motor vehicle sales company. The company sells motorcycles, passenger cars, vans and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or a lower level.</p>	8	3	