



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

End Semester Examination

May 2019

Max. Marks: 60

Class: SE

Course Code: CE42/IT43

Name of the Course: Database Management Systems

Duration: 180 Minutes

Semester: IV

Branch: Comp. Engg. / Inf. Tech.

Instructions:

- (1) All Questions are Compulsory.
- (2) Draw neat diagrams.
- (3) Assume suitable data if necessary.

Ques tion No.		Max. Marks	CO
Q1 a)	<p>In the 3-schema architecture of a database why do we need mappings between schema levels?</p> <p>Write a purpose of any four component of query processor of DBMS system architecture.</p>	<p>1</p> <p>4</p>	<p>1</p>
Q1 b)	<p>Draw the EER diagram: Given below is a problem statement</p> <p style="text-align: center;">‘The Photo Shop’</p> <p>You are hired to build a photographic shop. The shop sells photos that can be bought over the internet. More precisely, shop sells rights to use a photo. In this sense, a photo can be sold only once.</p> <p>We need to model information and activities that support the catalog of photos, models and photographers.</p> <p>We store some technical information for every photo like the type (color or black and white), type of film, shutter speed, f-stop, price, resolution, the photographer etc. A photo can be made by a single photographer. If photographer of a photo is known, we record the date of the shooting.</p>	<p>7</p>	<p>1</p>



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	<p>The photos are grouped into several broad categories – landscapes, portraits, and abstracts (everything that is not a landscape or a portrait). We are told that a photo cannot be a landscape and a portrait at the same time.</p> <p>We store some biographical information of the photographers. We also store some information about the models (in the case of portraits) and the information about the location the photo was taken in (for landscapes). For photographers, we record their name, date of birth, short bio, address, and nationality. We also store information about other photographers that influenced their work. We might need to record information about photographers, even if they have not made any of the photos we sell or sold at the store.</p> <p>The reason is to provide the customers with a database of photographers. For every landscape photo location, we need to record his/her name, date of birth, sex, and a short bio. A photo may picture several models. For every participation of a model in a portrait photo, we record the agency that provided the model (if available). For abstract photo we might store a comment</p>		
Q2 a)	<p>With example describe Update Anomalies and Deletion Anomalies in terms of Normalization.</p> <p>Consider a relation R with four attribute P, Q, R, S. For each of the following set of FDs assuming those are the only dependencies that hold. For R, the following are given,</p> <ol style="list-style-type: none"> 1. $R \rightarrow S, R \rightarrow S, Q \rightarrow R$ 2. $Q \rightarrow R, S \rightarrow P$ 3. $PQR \rightarrow S, S \rightarrow P$ 4. $P \rightarrow Q, QR \rightarrow S, P \rightarrow R$ 5. $PQ \rightarrow R, PQ \rightarrow S, R \rightarrow P, S \rightarrow Q$ <p>Identify the candidate keys for R</p>	2	4
		5	



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Q2 b)	<p>For the relation R given in Q2a) Identify the best normal form that R satisfies.</p> <p>Give suitable decompositions.</p> <p style="text-align: center;">OR</p> <p>Consider a relation R with 5 attributes ABCDE. Given the following dependencies: $A \rightarrow B$, $BC \rightarrow E$ and $ED \rightarrow A$.</p> <p>a) List all keys for R</p> <p>b) Is R in 3NF, justify c) Is R in BCNF ? , justify</p>	5	4
Q3 a)	<p>Consider the following schema:</p> <p>Suppliers (sid: integer, sname: string, address: string)</p> <p>Parts (pid:integer, pname:string, color:string)</p> <p>Catalog (sid:integer, pid:integer, cost:real)</p> <p>The key fields are underlined.</p> <p>Write the following first two (q1, q2) queries in tuple relational calculus (TRC) and next three queries in Relational Algebra (RA) (ie q3, q4, q5)</p> <p>q1) Find the names of the suppliers who supply some red part</p> <p>q2) Find the sids of suppliers who supply some red or green part</p> <p>q3) Find the sids of suppliers who supply some red part or at 221 Packer Ave.</p> <p>q4) Find the sids of suppliers who supply every red part</p> <p>q5) Find the pids of parts that are supplied by at least two different suppliers</p>	5	2
3b)	<p>Consider the following schema to solve the queries in SQL</p> <p>employee (<u>employee-name</u>, street, city)</p> <p>works (<u>employee-name</u>, company-name, salary)</p>	7	2



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	<p>company (company-name, city)</p> <p>manages (employee-name, manager-name)</p> <p>q1) Find all employees in the database who live in the same cities and on the same streets as do their managers</p> <p>q2) Find all employees in the database who do not work for First Bank Corporation</p> <p>q3) Find all employees in the database who earn more than each employee of Small Bank Corporation</p> <p>q4) Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located</p> <p>q5) Find the company that has the most employees</p> <p>q6) Modify the database so that Jones now lives in Newton</p> <p>q7) Give all employees of First Bank Corporation a 10% rise</p>		
Q4a)	<p>Write a PL/SQL code OR Stored procedure code to find the minimum and maximum age of the all students for the relation:</p> <p>Student(StudentID,Name,Age)</p>	5	2
Q4b)	<p>Create a trigger for the EMPLOYEE table that will fire for an UPDATE operation on an EMPLOYEE table. The side effect of this trigger will be seen in a audit/log file which should clearly show the following entries –</p> <p>Old salary, new salary , salary difference</p> <p>Update operation is giving 20% rise on the salary</p> <p>OR</p> <p>Create a trigger for a CUST_MSTR table which is fired when a delete operation is performed on CUST_MSTR. AUDIT_CUST table should maintain following information :</p>	7	3



		Operation	Old value	New value																																				
		Update	--	--																																				
Q5a)	Consider the following schedule S						5																																	
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	A) Give the precedence graph.						3																																	
	B) Is s is conflict serializable ?						1																																	
	C) Give serializable schedule for given schedule S.						3																																	
	OR																																							
	Write three conditions required to prove schedule is view serializable.																																							
	Prove or disprove that following schedule S and S' are view equivalent.						3																																	
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Q5b)	What is meant by Recovery scheme ?	1	3																																				
	Recovery scheme must also provide high availability , Justify ?	2																																					
	What are different types of failures that may occur in a system.	2																																					