



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(Synoptic)

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.

Question No.		Max. Marks	CO
Q1 a)	Need mappings (1mark) 1) It help to show transformation of data. 2) It help to define how data is store in database. Purpose of any four component of query processor carriers 1 x 4 marks	1 4	1
Q1 b)	Solution : Its an EER diagram. 1) Entity set Photo - grouping as landscape, portraits and abstract with its specialized attributes using a disjoint notation - 2 Marks 2) Photographers with Recursive relation with other photographer 1 Mark 3) Every Landscape photo location / Every participation of a mode in a portrait photo - 1 Mark 4) Rest all correct attributes, entities, Relationships, composite attributes - 3 Mark	7	1
Q2 a)	0.5 marks for description of each anomaly. 0.5 marks for example of each anomaly. Identification of candidate key (1marks) 1. Candidate key- Q 2. Candidate key- QS	2 5	4



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	3. Candidate key- PQR, QRS 4. Candidate key- PQ, QR, RS, PS Candidate key- PQ, QR, RS, PS		
Q2 b)	<p>Identification of normal form (0.5 X5)</p> <p>Decomposition (0.5 X5)</p> <p>1.R is in 2NF But not in 3NF</p> <p>2.R is in 1NF But not in 2NF</p> <p>3.R is in 3NF But not in BCNF</p> <p>4.R is in 3NF But not in BCNF</p> <p>5.R is in 3NF But not in BCNF</p> <p>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 Solution : CDE, ACD, BCD --- 2 marks</p> <p>b) Is R in 3NF justify Solution : R is in 3 NF because B, E and A are all parts of the key ---2M</p> <p>c) Is R in BCNF ? Solution : R is not in BCNF because none of the A, BC, and ED contain a key</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>	5	2



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	<p>The key fields are underlined.</p> <p style="text-align: right;"><i>On Last page</i></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>		
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> <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>sol : SELECT P.employee-name FROM employee P, employee R, manages M</p> <p>where P.employee-name = M.employee-name AND M.manager-name = R.employee-name AND P.street = R.street AND P.city = R.city (0.5 to 1 Mark)</p> <p>Correct query using natural join / nested option = 1 M <<applicable to all queries>></p> <p>q2) Find all employees in the database who do not work for First Bank Corporation</p> <p>SELECT employee-name FROM works where company-name != 'First Bank Corporation';</p> <p>q3) Find all employees in the database who earn more than each employee of Small Bank Corporation</p> <p>SELECT employee-name from works where salary > ALL (SELECT salary FROM</p>	7	2



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	<p>works where company-name = '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>select s.company-name from company S WHERE not exists ((select city from company where company-name = "small Bank Corporation") except (select city from company T where S.company-name = T.company-name))</p> <p>q5) Find the company that has the most employees</p> <p>SELECT company-name FROM works GROUP BY company-name having count (distinct employee-name) >= ALL (SELECT count(distinct employee-name) FROM works group by company-name</p> <p>q6) Modify the database so that Jones now lives in Newton</p> <p>UPDATE employee SET city='newton' WHERE person-name = 'Jones'</p> <p>q7) Give all employees of First Bank Corporation a 10% rise</p> <p>UPDATE works SET salary = salary*1.1 WHERE company-name = 'First Bank Corporation'</p>		
Q1a)	<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> <p>Solution : Complete correct code 5 marks</p>	5	2
Q1b)	<p>Create a trigger for the EMPLOYEE table that will fire for an UPDATE operation on an EMPLOYEE table.....</p> <p>Old salary, new salary , salary difference</p> <p>Update operation is giving 20% rise on the salary</p> <p>Solution : Complete correct syntax with all valid operations then 7 marks, syntax is correct but operation wrong 3 marks</p> <p>OR</p>	7	3



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Create a trigger for a CUST_MSTR table which is fired when a delete operation is performed...

Solution : Complete correct syntax with all valid operations then 7 marks, syntax is correct but operation wrong 3 marks

Q5a) Consider the following schedule S

- A) Give the precedence graph.
- B) Is s is conflict serializable ?
- C) Give serializable schedule for given schedule S.
- a) Solution : Graph with three node and three edges with proper direction carriers 3 marks.
- b) Yes (1 mark)
- c) Step by step conversion of schedule
Final schedule $T2 \rightarrow T3 \rightarrow T1$ (3 Marks)

OR

Write three conditions required to prove schedule is view serializable.

Prove or disprove that following schedule S and S' are view equivalent.

Solution :

Three Conditions (3marks)

1. Initial read
2. Intermediate read
3. Final Read

Given schedule is view equivalent.(Required description on each instruction to prove its view equivalent) (4 marks)

Q5b) Scheme : that restores the database to the consistent state that existed before the failure [1Mark]

High availability : ie. It must minimize the time for which the database is not usable after failure [2 Marks]

Failure types : Transaction: logical error , System error and System crash, Disk

TRC

$$q_1) \{ T \mid \exists T_1 \in \text{Suppliers} (\exists X \in \text{Parts} (X \cdot \text{color} = 'red' \vee \\ \exists Y \in \text{Catalog} (Y \cdot \text{pid} = X \cdot \text{pid} \wedge \\ Y \cdot \text{sid} = T_1 \cdot \text{sid}) \wedge \\ T \cdot \text{sname} = T_1 \cdot \text{sname})) \}$$

q₂)

$$\{ T \mid \exists T_1 \in \text{Catalog} (\exists X \in \text{Parts} (X \cdot \text{color} = 'red' \vee \\ X \cdot \text{color} = 'green' \wedge \\ X \cdot \text{pid} = T_1 \cdot \text{pid}) \wedge \\ T \cdot \text{sid} = T_1 \cdot \text{sid}) \}$$

RA

$$q_3) \{ (R_1, \pi_{\text{sid}} ((\pi_{\text{pid}} \sigma_{\text{color} = 'red'} \text{Parts}) \bowtie \text{catalog})) \}$$

$$\{ (R_2, \pi_{\text{sid}} \sigma_{\text{address} = '221 Packer Street'} \text{Suppliers}) \}$$

$$R_1 \cup R_2$$

$$q_4) (\pi_{\text{sid, pid}} \text{Catalog}) / (\pi_{\text{pid}} \text{Parts})$$

$$q_5) \{ (R_1, \text{Catalog}) \\ (R_2, \text{Catalog}) \}$$

$$\pi_{R_1 \cdot \text{pid}} \sigma_{R_1 \cdot \text{pid} = R_2 \cdot \text{pid} \wedge R_1 \cdot \text{sid} \neq R_2 \cdot \text{sid}} (R_1 \times R_2)$$