



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

November 2018

Max. Marks: 60

Class: T.E.

Course Code: IT53

Name of the Course: Advanced Database Systems

Duration: 3 Hrs

Semester: V

Branch: Information Technology

Instruction:

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

Q No.		Max. Marks	CO
Q.1 (a)	In Parallel databases how shared memory and shared disk architectures are used? Give the advantages and disadvantages of both.	4	CO1
(b)	Compare NOSQL and RDBMS.	4	CO4
(c)	What is temporal database? With appropriate example describe the types of temporal databases.	4	CO4
Q.2 (a)	Consider the following three linked relations: Students (studNbr, name, dob) Modules (modNbr, title) Results (studNbr*, modNbr*, grade) Suppose we have the following query: SELECT S.name FROM Students S, Modules M, Results R WHERE S.studNbr = R.studNbr AND M.modNbr = R.modNbr AND R.grade = 'A' AND S.dob >= '01-Jan-90'; (i) Draw an initial relational algebra tree for the above query. (ii) Apply a series of transformations to the tree obtained in part(i) to make the query more efficient. Discuss each step and state the heuristic used.	6	CO2
OR			
	In B+ tree for insertion write the overflow conditions for splitting leaf node and non-leaf node, if the node contains 7,9,13,15 and this node is full. Insert 8 in this node.	6	CO2
(b)	While designing the distributed database what types of replications are required. Justify with example and give the advantages and disadvantages of replication.	6	CO1

Q.3(a)

Consider an organization maintains the information about its customers. They store information about the customer in CUSTOMER table and the customer addresses in C_ADDRESS table as follows;

CUSTOMER(CId, CName, Prod_Purchased, Shop_Location)

C_ADDRESS(CId, C_Address)

The table CUSTOMER stores information about the customer, the product purchased from their shop, and the shop location where the product is purchased. C_Address stores information about permanent and present addresses of the customer. Here, CUSTOMER is the owner relation and C_ADDRESS is the member relation.

Figure 1: CUSTOMER table

CID	CNAME	PROD_PURCHASED	SHOP_LOCATION
C001	Ram	Air Conditioner	Mumbai
C002	Guru	Television	Chennai
C010	Murugan	Television	Coimbatore
C003	Yuvraj	DVD Player	Pune
C004	Gopinath	Washing machine	Coimbatore

Figure 2: C_ADDRESS table

CID	C_ADDRESS
C001	Bandra, Mumbai
C001	XYZ, Pune
C002	T.Nagar, Chennai
C002	Kovil street, Madurai
C003	ABX, Pune
C004	Gandhipuram, Ooty
C004	North street, Erode
C010	Peelamedu, Coimbatore

1. How would you fragment CUSTOMER relation on the shop_location attribute.

2. How would you fragment C_ADDRESS based on the fragment created on CUSTOMER relation. Fragment the relation C_ADDRESS, based on different location.

6

CO1

OR

Create any scenario for distributed database and with the help of that scenario explain deadlock detection technique in distributed database.

6

CO1

(b) Discuss the following Object Oriented data modelling concepts providing an example of each concept.
Object Identity and
Object Structure

6

CO1

Q.4 (a)	<p>Use the following XML document in the examples books.xml</p> <pre> <?xml version="1.0" encoding="UTF-8"?> <bookstore> <book category="cooking"> <title lang="en">Everyday Italian</title> <author>Giada De Laurentiis</author> <year>2005</year> <price>30.00</price> </book> <book category="children"> <title lang="en">Harry Potter</title> <author>J K. Rowling</author> <year>2005</year> <price>29.99</price> </book> <book category="web"> <title lang="en">XQuery Kick Start</title> <author>James McGovern</author> <author>Per Bothner</author> <author>Kurt Cagle</author> <author>James Linn</author> <author>Vaidyanathan Nagarajan</author> <year>2003</year> <price>49.99</price> </book> <book category="web"> <title lang="en">Learning XML</title> <author>Erik T. Ray</author> <year>2003</year> <price>39.95</price> </book> </bookstore> </pre> <p>Write the xpath queries for the following with output</p> <ol style="list-style-type: none"> 1. Select all the book titles 2. Select the title of the first book node under the bookstore element 3. Select the text from all the price nodes 	6	CO3
(b)	<p>What is graph database? Explain the property of graph data model for social network.</p> <p style="text-align: center;">OR</p> <p>What is Hypergraph? With the help of example explain the directed hyperedge.</p>	6	CO4
Q.5 (a)	What is the need of image database? How images are stored in database?	6	CO4
(b)	What are the advantages and disadvantages of distributed databases in designing distributed databases and what are the issues in designing distributed database?	6	CO1