CUMMINS COLLEGE OF ENGINEERING FOR WOMEN

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Third Year Electronics & Telecommunication

DATABASE MANAGEMENT SYSTEMS (SWAYAM ONLINE) (PEEC3201E)

Duration : 02:00 Hours | Max Marks : 50

Instructions :

1. All questions are compulsory.
2. Use of scientific calculator is allowed.
3. Draw diagrams wherever necessary.

Unit-1

Q No 1 a) (5)

What are mapping cardinalities and why are they used? Discuss their types in brief with suitable diagrams.

Unit-2

Q No 2 a) (5)

What are the Mobile App constraints? Illustrate the typical architecture of a mobile app with a suitable diagram.

Unit-3

Q No 3 a) (5)

Explain in brief the ways in which caching could be used to speed up Web server performance.

Unit-4

Q No 4 a) (5)

Redundant array of independent disks forms a major part in the storage structure of databases. Discuss this concept and compare its levels.

Unit-5

Q No 5 a) (5)

Discuss multi-table clustering file organization, as a file storage technique. For the relations given below:

domain	venue	budget
R&D	Matthew	900000
Finance	Smith	700000

The *domain* relation

ID	name	dept_name	salary
10101	Bob	R&D	65000
33456	Clay	Finance	85000
41565	Robert	R&D	75000
50021	Michael	R&D	50000

The *employee* relation

Write an SQL query that computes a natural join of the *domain* and the *employee* relations. Show the resultant multitable clustering file structure.

Unit-6

Q No 6 a) (5)

Considering the abstract transaction model:

a) Illustrate the state diagram of a transaction and elaborate on its states

b) Discuss a compensation transaction with an example

Unit-7

Q No 7 a) (5)

Consider the given transaction:

Ti: read(A);
A: = A-100;
write(A);
read(B);
B: = B + 100;
write(B);

[Given: Before the transactions; account A and account B have Rs.2000 and Rs.3000 respectively]

Suppose that a failure happened after write(A) operation but before write(B) operation, what is the effect on the database? What are the resultant values of accounts A and B? Will the value A+B be preserved? What is this condition known as?

Unit-8

Q No 8 a) (5)

Mention the reasons as to why concurrency is preferred. Let T1 and T2 be the two transactions. Transaction T1 transfers $100 from account A to account B, whereas transaction T2 transfers 10% of the balance from account A to account B.

Assuming a serial scheduling scenario, write the transactions in the order:
a) T1 followed by T2
b) T2 followed by T1
Compare the results and comment on its consistency.

[Given: Prior to the transactions; account A and account B have $1000 and $500 respectively]

Q No 9 a) (5)

Given the concurrent schedule below:
[Assume that, prior to the transactions; account A and account B have $100 and $200 respectively]

T1	**T2**	**Concurrency Control Manager**
lock – X(B)		
		grant – X(B, T1)
read(B)		
B: = B – 50		
write(B)		
unlock(B)		
	lock – S(A)	
		grant – S(A, T2)
	read(A)	
	unlock(A)	
	lock – S(B)	
		grant – S(B, T2)
	read(B)	
	unlock(B)	
	display(A + B)	
lock – X(A)		
		grant – X(A, T1)
read(A)		
A: = A – 50		
write(A)		
unlock(A)		

- What does transaction T2 display?
- Is the displayed result correct?
- If not, re-write the transactions as serial schedules with the necessary changes to give a consistent state for displaying (A + B)

Unit-10

Q No 10 a) (5)

Elaborate on query processing in a database system. Explain the steps involved in it with a suitable diagram.