Enrolment No: E23CSEU0517   Name of Student: March

Department/ School: CS

END-TERM EXAMINATION, ODD SEMESTER DECEMBER 2024

COURSE CODE: CSET201

COURSE NAME: Information Management Systems

PROGRAM: B.Tech.

MAX. DURATION: 2 HRS

TOTAL MARKS: 40

				Mapping of Questions to Course and Program Outcomes					
Q.No.	A1	A2	A3	A4	B1	B2	B3	B4	
CO	3	1	2	2	2	1	4, 6	5, 6	
PO	1, 3	1, 6	1, 4	1, 4	1, 4	1, 5	2	4	
BTL	1	2	2	3	4	3			

GENERAL INSTRUCTIONS: -

1. Do not write anything on the question paper except **name, enrolment number and department/school.**
2. Carrying mobile phones, smartwatches and any other non-permissible materials in the examination hall is an act of UFM.

COURSE INSTRUCTIONS:

a) Solve the questions in the order they are presented. Each question is numbered accordingly, and it is recommended to follow the sequence provided.

b) **All questions are compulsory.**

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SECTION A   **[4Qx5Marks = 20 Marks]**

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A1) Define DDL and DML commands. Also, explain their key differences and describe how they complement each other in database operations.   **[2+3=5 Marks]**

A2) Explain cardinality and participation constraint types in the context of ER diagrams. Provide a real-world example for each type and illustrate them in an ER diagram.   **[3+2=5 Marks]**

A3) Consider a relation R (A, B, C, D, E, F) with functional dependencies $F = \{AB \rightarrow E, C \rightarrow F, B \rightarrow C, A \rightarrow BD\}$. The relation is decomposed into R1(AB), R2(BC), R3(ABD), R4(EF). Explain in detail how this decomposition preserves dependency.   **[5 Marks]**

A4) Explain the necessary conditions of 2NF. Consider a relation R (A, B, C, D, E, F, G, H) with functional dependencies $F = \{ABC \rightarrow DE, E \rightarrow GH, H \rightarrow G, G \rightarrow H, ABCD \rightarrow EF\}$. Identify the candidate key(s) in the above relation. Explain if the above relation R is in 2 NF.   **[1+2+2=5 Marks]**

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SECTION B   **[4Qx5Marks = 20 Marks]**

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B1) Consider the following schedule-x given in Table I of operations for transactions T1 and T2, where each transaction performs actions on resources (R1, R2). Based on this schedule, check if a deadlock is involved or not. If a deadlock exists, explain how it can be prevented using the Wait/Die and Wound/Wait schemes.

T1	T2
Lock X(A)	
	Lock X(B)
X(B) (wait)	
	X(A) wait

Table I: Schedule-x   [2+1.5+1.5=5 Marks]

B2) Consider transactions T1, T2, T3, T4, and T5 by reading and writing operations on data items A and B. Explain with the help of a precedence graph whether the given Table II for schedule-S is conflict serializable or not. If yes, then determine all the possible serialized schedules.   [5 Marks]

T1	T2	T3	T4	T5
		W(A)		
	R(A)			
	W(B)			
		R(A)		
W(B)				
R(A)				
				W(A)
			W(B)	

Table II: Schedule-S

B3) List the differences between Conservative, Strict, and Rigorous Two-Phase Locking protocols. Identify which of these protocols provides the highest level of safety for deadlock prevention and how.   [1+1+1+2=5 Marks]

B4) A social networking platform is being developed where users can create profiles, connect with friends, post updates, comment on posts, like posts, and send private messages. The platform needs to scale to handle millions of user interactions per second. Analyse how a NoSQL database would better fit than an RDBMS for managing user profiles and social connections. Discuss at least four key points to support your answer.   [5 Marks]

-ALL THE BEST-