VIT
Vellore Institute of Technology
CHENNAI

Reg. Number:	22BAZ1268

Continuous Assessment Test (CAT) – II - APR 2024

Programme	:	B.Tech. CSE and its specialization	Semester	:	Winter 2023-24
Course Code & Course Title	:	BCSE302L / Database Systems	Slot	:	D1+TD1
Faculty	:	Dr. Jenila Livingston L M Dr. Balasundaram A Dr. Amrit Pal Dr. Leninisha Shanmugam Dr. Abishi Chowdhury Dr. Sandhya	Class Number	:	CH2023240501571 CH2023240501561 CH2023240501565 CH2023240501567 CH2023240501563 CH2023240501560
Duration	:	1 Hr. 30 Mins.	Max. Mark		50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		Consider a customer reservation relation given below: CUSTOMER(C_name,Phone,Room_id,Room_type,Check-in,Check-out,Room_rate,dis_rate,Reservation_id,Card_id,Card_type,Validity) The Functional dependencies are: Card_id → Card_type, Validity Reservation_id → C_name, Phone, Room_id, Check-in, Check-out, Card_id, Card_type, Validity Room_id → Room_id, Room_rate Room_id, Reservation_id → dis_rate Identify the key(s) and decompose the relation till BCNF.	10
2		Consider the given relation and answer to the following questions: **Company** **Company_Id** | **Unit** | **Unit-Cost** 11 | 12 | 50000 29 | 10 | 20000 14 | 18 | 10000 18 | 5 | 70000 10 | 24 | 5000 21 | 30 | 7000 28 | 12 | 14000 19 | 70 | 4000 30 | 10 | 70000 25 | 15 | 10000	10

	a	Explain any indexing method (excluding B+ tree) which is available for data that are not sorted by the indexed field (Company_ID) using the aforementioned Company relation. [3 marks]	
	b	Illustrate how **B+ Tree indexing with order 4** can be used for the given relation based on the Company_id attribute. After inserting all the above ten records delete the first and last records. [7 marks]	
3	a	Assume that the keys 11, 13, 25, 3, 15, 23 5, 35, 1 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and quadratic probing. Draw the resultant hash table after inserting the keys. [4 marks]	10
	b	Suppose we can represent the keys Rio, Rick, Jhon, Ema, Bob, Siya, Alex, Pranav, Akash, Priya, Divya, Mark, Tony, Mia, and Narman in the following way:	

Keys	representation
Rio	111101
Rick	100010
Jhon	010011
Ema	011110
Bob	111111
Siya	110001
Alex	010110
Pranav	001011
Akash	101111
Priya	111110
Divya	011011
Mark	101011
Tony	100001
Mia	110000
Narman	000111

Hash the above keys using extendible hashing with bucket size 5. [6 marks]

4	a	Consider the following tables: dealer(dealerid, dealername, city) distributor(distributorid, distributorname, city) orders(orderid, dealerid, distributorid, orderdt) Derive the relational algebraic expressions for the following scenario: List the dealername of dealers who have placed orders between 10-Jan-2022 and 31-Mar-2022. [2 marks]	10
	b	Consider the below SQL query: SELECT orderid, dealername, orders.dealerid, orders.distributorid FROM dealer, distributor, orders WHERE dealer.city <> distributor.city AND orders.dealerid = dealer.dealerid AND orders.distributorid = distributor.distributorid AND orderdt = '22-JAN-2024'. Using Heuristic optimization, draw the optimized query tree for the above query. [8 marks]	

5		Consider each of the schedules mentioned below: • T1 : R1(A), R1(B), W1(A), W1(B) • T2 : R2(B), W2(B), R2(C), W2(C) • T3 : R3(C), W3(C), R3(A), W3(A) Check whether the given schedules are conflict-serializable or not? If yes, give the possible serialization order. S1: R2(B), W2(B), R3(C), W3(C), R3(A), W3(A), R2(C), W2(C), R1(A), R1(B), W1(A), W1(B) S2: R2(B), W2(B), R3(C), W3(C), R1(A), R1(B), W1(A), W1(B), R2(C), W2(C), R3(A), W3(A)	10

**********All the best **********