



VIT

Vellore Institute of Technology
Deemed to be University under section 2 of UGC Act, 1956
CHENNAI - 600 022

Reg. Number:

22BCE143

Continuous Assessment Test (CAT) – II - March 2024

Programme	: B.Tech (CSE)	Semester	: Winter Semester 2023-2024
Course Code & Course Title	: BCSE302L & Database Systems	Slot	: A2+TA2
Faculty	Dr. M. Premalatha Prof. Sukanya G Dr. Vijayakumar K P Dr. Graceline Jasmine S	Class Number(s)	CH2023240502443 CH2023240502444 CH2023240502446 CH2023240502447
Duration	: 90 Mins	Max. Mark	50

Answer all questions

Q. No	Sub Sec.	Description	Marks																																								
1.		<p>Consider the relation R (U, V, W, X, Y, Z) and the following functional dependencies: $\{U \rightarrow W, UV \rightarrow W, W \rightarrow XZ, WX \rightarrow Z, YW \rightarrow UV, YZ \rightarrow W\}$</p> <ul style="list-style-type: none"> i). Find the closure for all the L.H.S and compute the candidate key (2 Marks) ii). Find the minimal Cover (6 Marks) iii). Find the candidate key from the final set of functional dependencies and compare the newly generated candidate key, with the candidate key generated from, sub division i) of Question number 1 and justify your answer. (2 Marks) 	10																																								
		<p>Consider the cars available in the Southern Indian market.</p> <p>Table 1: Cars</p> <table border="1"> <thead> <tr> <th>Company</th><th>Country</th><th>Make</th><th>Model</th><th>Distributor</th></tr> </thead> <tbody> <tr> <td>Hyundai</td><td>Korea</td><td>Nios</td><td>Asta, Sportz</td><td>Kun</td></tr> <tr> <td>Skoda</td><td>Germany</td><td>Kushaq</td><td>TSI Active</td><td>Gurudev</td></tr> <tr> <td>Tata</td><td>India</td><td>Altroz</td><td>XE</td><td>Gurudev</td></tr> <tr> <td>Tata</td><td>India</td><td>Nexon</td><td>XM</td><td>Gurudev</td></tr> <tr> <td>Skoda</td><td>Germany</td><td>Kushaq</td><td>TSI Monte</td><td>Kun</td></tr> <tr> <td>KIA</td><td>Korea</td><td>Sonet</td><td>HTE, HTK</td><td>Kun</td></tr> <tr> <td>KIA</td><td>Korea</td><td>Seltos</td><td>HTE, HTK</td><td>Capital Kia</td></tr> </tbody> </table> <p>a) Find out the type of anomaly for the following cases considering Table 1 (3 Marks)</p> <ul style="list-style-type: none"> i). Suppose KIA, a company from Korea, is now collaborating with Tata to bring the make XM in the Indian market with no distributor announced yet ii). Suppose Kun is no more a distributor for the make Asta of Hyundai, a company from Korea iii). Suppose Hyundai is no more a Korean company due to its 100% procurement by Tata, a company from India. <p>b) Normalize the Table 1 up to the Third Normal form (7 Marks)</p>	Company	Country	Make	Model	Distributor	Hyundai	Korea	Nios	Asta, Sportz	Kun	Skoda	Germany	Kushaq	TSI Active	Gurudev	Tata	India	Altroz	XE	Gurudev	Tata	India	Nexon	XM	Gurudev	Skoda	Germany	Kushaq	TSI Monte	Kun	KIA	Korea	Sonet	HTE, HTK	Kun	KIA	Korea	Seltos	HTE, HTK	Capital Kia	10
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3.		<p>Consider the following car rental business scenario and create four tables namely car, customer, rental and bill with appropriate key constraints applied on it: Cars are always rented from one location and are brought back to the same location. Customers may pay by cash or credit card. Customers who call the agency may request a particular car or model. A bill is presented to the customers after the travel.</p> <p>Note: Use Natural Join or Cartesian Product without using <i>on</i> keyword. Specify the appropriate schemas for the scenario, write SQL query and relational algebra expression for the following: (5*2=10 Marks)</p>	10																																								

- i). List the customer's details who resides in Chennai and have rented Marathi 'baleno'.
- ii). List the bills generated so far for the model 'innova'.
- iii). Specify the name of the customer who have rented Audi car for more than 3 times
- iv). Find the average bills for each city if the average bill exceeds 20000
- v). List the name of the customer, the car model he rented, his from location, to location along with the date on which the car is rented.

4.

Consider the following schema

customer(custid, custname, address)

items(iid, iname, price)

order(iid, cid, qty)

10

Query: List the item names purchased by more than ~~average~~ number of items purchased by all the customers

For the specified query, perform the following:

- Derive the relational algebra expression for the above query using Cartesian product without using 'on' keyword. (2 Marks)
- Optimize the relational algebra expression by drawing the step by step optimized execution plan with rules involved (6 Marks)
- Write the optimal relational algebra expression (2 Marks)

Consider the information related to orders and salesman

Ord No	Cust_id	Product Name
60001	2003	Handbag
60004	2005	Handbag
60015	2008	Watch
60021	2001	Calculator
60011	2004	Pots
60008	2000	Calculator
60009	2009	Watch

10

Perform the following for the **dense and sparse indexing**: (5*2=10 Marks)

- Create a primary index for the attribute "Product_Name"
- Add the instance "60007 2012 Watch"
- Add the instance "60014 2006 Wallet"
- Delete the instance "60021 2001 Calculator"
- Delete the instance "60011 2004 Pots"