Reg. No.: 21BPS1364

Name : Mubin

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Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test (CAT-1) – January 2023

Programme	:	B.Tech (CSE & Specializations)	Semester	:	Winter Semester 2022-23
Course Code	:	BCSE302L	Slot	:	E2+TE2
Course Title	:	Database Systems			
Faculty(s)	:	Dr. Appalaraju Muralidhar Dr. L.M. Jenila Livingston Dr. A. Balasundaram Dr. J. Uma Maheswari Dr. Abishi Chowdhury Dr. Rajesh M Dr. Manjula D	Class Nbr(s)	:	CH2022235000916 CH2022235000919 CH2022235000920 CH2022235001197 CH2022235001198 CH2022235001262 CH2022235001264
Time	:	One Hour and Thirty Minutes	Max. Marks	:	50

Answer all the Questions

1.	Suppose you have a bank database with Account (Account_number, Balance, Branch_code, Customer_id), Branch (Branch_name, Branch_code, Asset), Customer (Customer_id, Customer_name, Customer_street, Customer_city), Loan (Loan_no, Amount, Branch_code, Customer_id) as entity sets. i) To execute a query that retrieves the count of account numbers present in branch code 1001, discuss the functionality needed for runtime database processor (query processor). **[4 marks]** ii) Explain how the tuples are organised in Relational, Network and Hierarchical database models for above scenario. **[6 marks]**	[10]
2.	Assume that you are planning to develop an online shopping cart system. Suggest suitable database schema architecture for this system that guarantees proper insulation between application, program code and data. State all your assumptions in detail pertaining to the architecture considered for this system.	[10]
3.	i) Create the following relations using SQL: **[6 marks]**	[10]

STUDENT

Attribute Name	Data Type	Size	Constraint
Stu_id	INT		PRIMARY KEY
Stu_name	VARCHAR2	15	NOT NULL
City	VARCHAR2	10	NOT NULL
Phone_number	NUMBER		UNIQUE
Date_of_birth	DATE		NOT NULL
Stu_sub_id	VARCHAR2	15	FOREIGN KEY
CAT1_marks	INT		Not more than 50

SUBJECT

Attribute Name	Data Type	Size	Constraint
Sub_id	VARCHAR2	15	PRIMARY KEY
Sub_name	VARCHAR2	15	NOT NULL
Student_count	INT		NOT NULL

ii) Answer the following queries in SQL: **[4 * 1 = 4 Marks]**

a) Add one more attribute named DA1_marks in student table with default value 0.

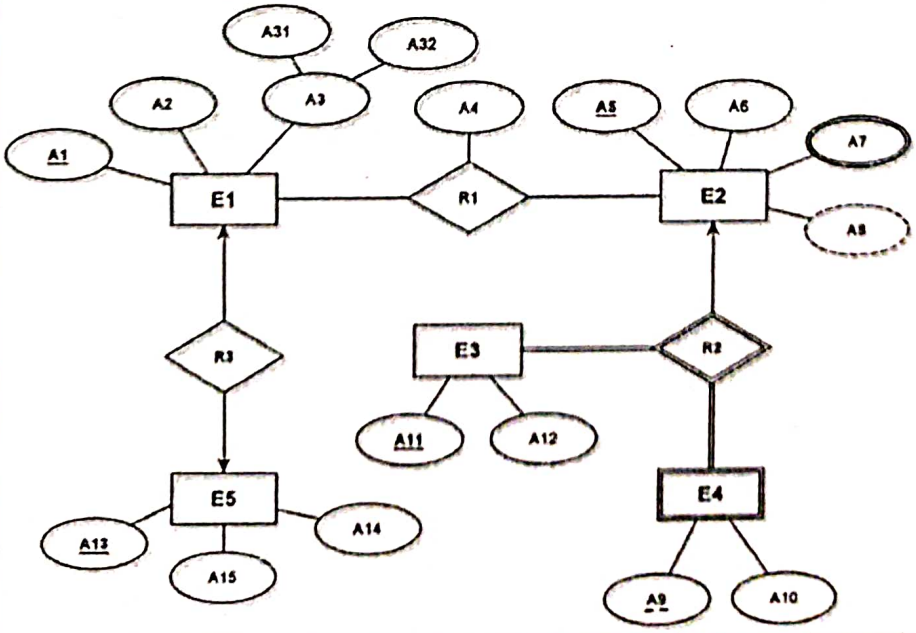
b) Display the names and phone numbers of students from the city 'Chennai'.

c) List the students who have scored more than 25 marks but less than 40 marks in CAT1.

d) List the details of students whose names end with "t".

4. An online shopping company wants to model their day-to-day activities. The company has its own company id and name of the company as attributes. The company has many sellers. Each seller is having seller id, name and locations. The seller has many locations. The seller should be a part of only one company. The seller can sell multiple products. Each product has product id, product name, description and price. The seller can sell many products. One product can be sold by many sellers. The customer can buy many products. Each customer has customer id, customer name, address and customer category (normal/prime). For each order made by the customers has the information regarding order like order id, quantity, unit price, total price and payment type. Each order has shipping details like shipping status, transit location and tracking id. Each order has payment details which includes transaction id, amount and payment gateway. **Draw an ER diagram** for the online shopping company. Identify and indicate all key and cardinality constraints and any assumptions that you make. **[10]**

5. Convert the below ER diagram to its equivalent relational model diagram. The diagram should clearly indicate all the individual tables, fields and relationships indicated along with the key constraints. **[10 Marks]** **[10]**



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Continuous Assessment Test I – Jan 2023

Programme	:	B.Tech. (CSE & Specializations)	Semester	:	Winter 2022-23
Course Title	:	Database ~~Technologies~~ Systems	Code	:	BCSE302L
			Slot	:	E1+TE1
Faculty	:	Dr. A Muralidhar, Dr. L.M Jenila Livingston, Dr. S. Renuka Devi, Dr. Abishi Chowdhury, Dr. R. Reena Roy, Dr. S. Geetha, Dr. J. Uma Maheswari	Class Nbr	:	CH2022235000911, CH2022235000913, CH2022235001194, CH2022235001195, CH2022235001196, CH2022235001260, CH2022235001261
Time	:	1 ½ Hrs	Max. Marks	:	50

Answer ALL the questions

1. Consider that you are designing a web application for an online train ticket reservation system. This website will be developed for online seat reservations, searching the train schedule, seat availability, train timings, fare inquiry, and listing trains between stations. Which DBMS architecture would you choose? Draw the architectural diagram of the chosen one and explain it in detail. [10]

2. You have been newly appointed as the database administrator for the banking enterprise, Global Pvt. Ltd. The storage and retrieval of all data have previously been done using traditional file system approaches. Now, as the database administrator, [10]
   a) explain the merits of database management systems over traditional approaches. Elaborate. (6 marks)
   b) what would be your roles and responsibilities? (4 marks)

3. Consider the patient and doctor relational schemas as specified: [10]

Patient

S.No.	COLOUMN NAME	DATA TYPE	CONSTRAINT
1.	PNO	NUMBER	Primary Key
2.	PNAME	VARCHAR2(30)	Not Null
3.	AGE	NUMBER	Age should be >10
4.	GENDER	VARCHAR2(1),	
5.	DOC_ID	NUMBER	Foreign key

Doctor

D.No.	COLOUMN NAME	DATA TYPE	CONSTRAINT
1.	DOC_ID	NUMBER	Primary Key
2.	DNAME	VARCHAR2(30)	Not Null
3.	GENDER	VARCHAR2(1)	
4.	QUALIFICATION	VARCHAR2(30)	
5.	HOSP_NAME	VARCHAR2(30)	Default Value is YMC
6.	NoofOpdDays	NUMBER	Should not be 0

Write SQL queries for the following:

(i) Create the tables above relations with all the given constraints. (6 Marks)

(ii) Display the details of all patients in descending order of their age. (1 Mark)

(iii) Display the doctor's DNAME, GENDER, QUALIFICATION and HOSP_NAME, whose DNAME starts with 'A' and ends with 't'. (1 Mark)

(iv) Display the patient details like PNO, FNAME and AGE for DOC_ID 101 and 102. (1mark)

(v) Find the list of all doctors with NoofOpdDays greater than 3. (1 Mark)

4. The GymKhana chain of fitness centers has come with an offer to you where they will supply your lifetime free health supplements, if you help them in designing their database. Since you are a health and fitness freak, you agree for the deal. Over an interview with the key persons, you collect the following information: [10]

- Customers who come to the Gym are identified by their Aadhar number. Customer's names, addresses, and ages must also be recorded.
- Fitness Trainers are identified by their Aadhar number. For each fitness trainer, the name, special skills, willingness to train for male/female/unisex and years of experience must be recorded.
- Each Health Supplement Manufacturing company is identified by name, address and has a phone number.
- For each type of health supplement (Bones, muscles, skin, hair etc.) – as Protein, Calcium, Peptides, Spirulina, etc., the brand name and its formula must be recorded. Each health supplement is sold by a given Health Supplement Manufacturing company, and the brand name identifies a health supplement uniquely from among the products of that company. If a health supplement company is deleted, you need not keep track of its products any longer.
- Each health supplement dealer has a name, an address, and phone number.
- Every customer has a primary fitness trainer. Every fitness trainer has at least one customer.
- Each Health Supplement dealer company sells several health supplement products and has a price for each. A health supplement could be sold at several Health Supplement dealer companies, and the price could vary from one dealer company to another.
- Fitness trainers prescribe health supplement products for customers. A fitness trainer could prescribe one or more health supplement products for several customers, and a customer could obtain prescriptions from several fitness trainers. Each such prescription has a date and a quantity associated with it. You

can assume that if a fitness trainer prescribes the same health supplement product for the same customer more than once, only the last such prescription needs to be stored.

- Health Supplement Manufacturing companies have long-term contracts with health supplement dealers. A Health Supplement Manufacturing company can contract with several dealers, and a dealer can contract with several Health Supplement Manufacturing companies. For each contract, you have to store a start date, an end date, and the text of the contract.
- Dealers delegate a Executive Manager for each contract. There must always be an executive manager for each contract, but the contract executive manager can change over the lifetime of the contract.

Draw an ER diagram that captures the above information. Identify any constraints that are not captured by the ER diagram.

5. Illustrate the stepwise procedure to map the given E-R diagram into a Relational model. [10]