Vellore Institute of Technology
CHENNAI

Continuous Assessment Test (CAT) – I - February 2024

Programme	:	B.Tech (CSE)	Semester	:	Winter Semester 2023-2024
Course Code & Course Title	:	BCSE302L & Database Systems	Slot (s)	:	A1+TA1
Faculty	:	Dr. M. Premalatha Dr. Priyaadharshini M Dr. Vijayakumar K P	Class Numbers	:	CH2023240502438 CH2023240502440 CH2023240502441
Duration	:	90 Mins	Max. Mark		50

Answer all questions

Q. No	Sub Sec.	Description	Marks
1	a)	Construct an ER diagram for the given requirements. • Products identified with ProductID, Name, Price, QuantityAvailable • Customers identified with CustomerID, Name, Email, Address • Orders identified with OrderID, Date, TotalAmount • A customer can place multiple orders and each order is associated with one customer. • A product can be part of multiple orders and each order can have multiple products. • Every order must be placed by a customer and every product must be included in an order. • Consider adding a "Payment" entity as a weak entity, dependent on the "Order" entity. Each payment can have a unique transaction ID, payment method, and amount. • Include a multivalued attribute like "Attributes" for products, capturing additional features that vary for each product. • Break down the address of the customer name into first_name, middle_name and last_name. • Introduce a derived attribute like "OrderStatus" for orders, based on the status of individual products within the order. • Include a descriptive attribute like "Description" for products. • In the relationship between a customer and an order, the customer can play the role of "Buyer," and the order can play the role of "Placed Order." Similarly, in the relationship between a product and an order, the product can play the role of "Ordered Product," and the order can play the role of "Order Items."	8
	b)	Describe the steps required in converting an ER diagram into relational schemas. Use the diagram you drew in section 1a, convert it into relational schemas, and then draw the corresponding schema diagram.	7
2		Let's consider a scenario for a library management system where we can demonstrate the concept of inheritance using EER model. Draw an ER diagram with extended features that meet the following requirements: • LibraryMember includes MemberID (Primary Key), Name, Address, Email • Book includes ISBN (Primary Key), Title, Author, Genre, PublicationYear • Transaction includes TransactionID (Primary Key), DateBorrowed, DateReturned • Now, let's introduce the concept of inheritance by creating two specialized entities (Student, Faculty) that inherit from the LibraryMember entity.	10

- Student includes StudentID (Primary Key), Grade, Major
- Faculty includes FacultyID (Primary Key), Department, OfficeNumber
- BorrowedBy has Many-to-Many relationship between LibraryMember and Book entities.
- Each library member can borrow multiple books, and each book can be borrowed by multiple members.
- Borrowed has One-to-Many relationship between Student and Transaction entities.
- Each student can have multiple transactions, but each transaction is associated with only one student.
- Borrowed has One-to-Many relationship between Faculty and Transaction entities.
- Each faculty member can have multiple transactions, but each transaction is associated with only one faculty member.

3 Consider the following relational model — 15

Purchase table

Transaction ID	Customer ID	Product ID	Purchase date
1112	24221	8977	03-22-2010
1113	24222	8978	03-22-2010
1114	24223	8979	03-22-2010

Customer ID	Customer	Address
24221	Bob	123 East street
24222	Alice	223 Main street
24223	Martha	465 North street

Customer table

Product ID	Name	Price
8977	Banana	.79
8978	TV	400
8979	Watch	50

Product table

Write SQL queries for the following:

(i) Create the purchase relation with key attributes and set the purchase date as not null [4 Marks]

(ii) Add unique constraint to customer name [1 mark]

(iii) Add default constraint to the purchase date [1 mark]

(iv) Add check constraint to price and make sure that the value has to be greater than 0 always [2 marks]

(v) Add an attribute mobile number to the customer table that accepts only the values starting with '+91'. [3 marks]

(vi) Drop the unique constraint from customer relation [1 mark]

(vii) Drop the any primary key constraint. Elaborate the consequences of executing this statement based on the referential integrity you have established for this schema. [3 marks]

4 Consider that you are designing a web application for flight ticket reservation system. This website is built for searching the Availability of flights, Schedule, Availability of seats, Fare details and enables the passengers to book tickets. — 10

- Identify and discuss an appropriate schema architecture for the given scenario with suitable diagram [5 marks]
- Elaborate how the details are processed and retrieved across the various components using query in the Database System Architecture [5 marks]