



VIT

Vellore Institute of Technology
Approved by AICTE, Government of India, New Delhi

REG.NO.:

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025

SLOT: B1+TB1

Programme Name & Branch : B.Tech IT
Course Code and Course Name : BITE302L , Database Systems
Faculty Name(s) : Dr. Lawanya Shri M, Dr. Bimal Kumar Ray, Dr. Tapan Kumar Das
Class Number(s) : VL2024250502779, VL2024250502772, VL2024250502782
Date of Examination : 28/1/25
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s): Answer All Questions

• **CO – Course Outcome:**

1. Identify the basic concepts of database and various data models used in DB design
2. Design conceptual models to represent simple database application scenarios
3. Populate and query a database using SQL and PL/SQL. Also apply Query processing and indexing techniques to optimize the database system performance

• **BL – Blooms Taxonomy Level:**

- 1 – Remember, 2 – Understand, 3 – Apply

Q. No	Question	M	CO	BL
1.	a) A medium-sized e-commerce company is expanding its operations and needs to revamp its database system. The company has a large catalog of products, user data, and transaction history. They need to ensure that their database is scalable, secure, and optimized for performance, as they plan to handle a significant increase in traffic. The company hires two key professionals Database Designer and Database Administrator (DBA) for this task. Discuss the responsibilities of Database Designer and Database Administrator in detail	5		
	b) A large university has a comprehensive student management system that tracks a variety of data, such as student records, courses, faculty information, and department details. The system serves multiple users, including students, faculty, and administrative staff. To make the system more manageable, efficient, and secure, the university decides to implement data abstraction through a Database Management System (DBMS). Describe the three levels of data abstraction that helps the university manage complex data while providing different users with tailored views of the system.	5	1	1
2.	The healthcare organization utilizes various components of the DBMS to manage its extensive database system effectively. By understanding the role and function of each DBMS component, the organization can ensure its system operates smoothly, securely, and efficiently, providing healthcare professionals with accurate and timely information. Explicate the various components of database management software with a neat diagram.	10	1	1
3.	The Prescriptions-A-B-chain of pharmacies has offered to give you a free lifetime supply of medicine if you design its database. Given the rising cost of health care, you agree. Here's the information that you gather: • Patients are identified by an SSN, and their names, addresses, and ages	10	2	2



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	must be recorded. • Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experience must be recorded. • Each pharmaceutical company is identified by name and has a phone number. • For each drug, the trade name and formula must be recorded. Each drug is sold by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company. If a pharmaceutical company is deleted, you need not keep track of its products any longer. • Each pharmacy has a name, address, and phone number. • Every patient has a primary physician. Every doctor has at least one patient. • Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another. • Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors. • Each prescription has a date and a quantity associated with it. You can assume that, if a doctor prescribes the same drug for the same patient more than once, only the last such prescription needs to be stored. Draw an ER diagram that captures the preceding information. Identify any constraints not captured by the ER diagram.			
4.	a) Explain the concept of cardinality constraint and participation constraint on relationship type and illustrate the same with suitable example. b) Explain the concept of overlapping constraint and disjointness constraint in EER model and illustrate the same with diagram.	10	2	3
5.	Consider the following relational schema, where the keys are underlined and perform the following operations: Employee (<u>ssn</u>, name, gender, address, salary, supervisorSSN, dnumber, mobileno) Department (<u>dnumber</u>, dname, managerSSN) Department_Location (<u>dnumber</u>, dlocation) a) Create the above three tables with primary key and foreign key constraints [5] b) Add check constraint to gender having values 'male', 'female', 'trans_gender'. [1] c) Add unique key constraint to mobile_no. [1] d) Change the location of the department having dnumber '345' [1] e) Display the details of employee having name starting with 'S' and ending with 'A' with maximum length =5 [1] f) Delete the employee having salary in the range 50000 & 60000 (use between) [1]	10	4	2