



NSS COLLEGE OF ENGINEERING, PALAKKAD
Govt. Aided College Affiliated to APJ Abdul Kalam Technological University
Approved by AICTE

FOURTH SEMESTER B.TECH DEGREE
FIRST INTERNAL EXAMINATION APRIL 2023.
Department of Computer Science & Engineering
CST 204 Database Management Systems

Time: 2:00 Hour

Maximum Marks: 50

(Answer all five questions.)

Modules 1 to 3: Part 'a' of each question is compulsory and it carries 3 marks.

Answer either part 'b' or part 'c' of each question, which carries 7 marks each.

Q.no.	MODULE 1	Marks
1.a	Give and justify any three advantages of DBMS over file system	3
	Answer b or c	
b	Explain the three scheme architecture of DBMS with a neat diagram	7
c	Explain the DBMS system environment with a neat diagram	7

Q.no.	MODULE 1	Marks
2.a	What is a recursive relationship? Give an example	3
	Answer b or c	
b	<p>Consider a manufacturing company with the following requirements.</p> <p>Manufacturers have a name, which we may assume is unique, an address, and a phone number. Products have a model number and a type (e.g., television set). Each product is made by one manufacturer, and different manufacturers may have different products with the same model number. However, you may assume that no manufacturer would have two products with the same model number. Customers are identified by their unique social security number. They have email addresses, and physical addresses. Several customers may live at the same (physical) address, but we assume that no two customers have the same email address. An order has a unique order number, and a date. An order is placed by one customer. For each order, there are one or more products ordered, and there is a quantity for each product on the order.</p> <p>Design an ER schema for the above requirements.</p>	7

c	<p>Suppose that you are designing a schema to record information about reality shows on TV. Your database needs to record the following information:</p> <p>For each reality show, its name, genre, basic info and participants name. Any reality show has at least two or more participants.</p> <p>For each producer, the company name, company country. A show is produced by exactly one producer. And one producer produces exactly one show.</p> <p>For each television, its name, start year, head office. A television may broadcasts multiple shows. Each show is broadcasted by exactly one television.</p> <p>A user may rate multiple shows, and a show may be rated by multiple users.</p> <p>Draw an entity relationship diagram for this database.</p>	7
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Q.no.	MODULE 2	Marks
3.a	<p>Write SQL DDL Statements to construct the below tables by assuming necessary key and referential integrity constraints</p> <p>BOOKS (ACC-NO, ISBN, TITLE, EDITION, YEAR)</p> <p>MEMBERS (MEMBERID, MEMBERNAME, MEMBERTYPE)</p> <p>ISSUEDTO (ACC-NO, MEMBERID, DATE OF ISSUE)</p>	3
	Answer b or c	
b	Derive the relational schema for the question given in 2.b using ER to relational schema mapping rules.	7
c	<p>Convert the schema given below to an relational schema</p>	7

Q.no.	MODULE 2	Marks
4.a	<p>For the relational scheme given below</p> <p>Doctor(SSN, FirstName, LastName, Specialty, YearsOfExperience, PhoneNum)</p> <p>Patient(SSN, FirstName, LastName, Address, DOB, PrimaryDoctor_SSN)</p> <p>Medicine(TradeName, UnitPrice, GenericFlag)</p> <p>Prescription(Id, Date, Doctor_SSN, Patient_SSN)</p> <p>Prescription_Medicine(Prescription Id, TradeName, NumOfUnits)</p> <p>Identify the key and referential integrity constraints within and between the relations</p>	3
	Answer b or c	
b	<p>For the relational scheme given in question 4. a</p> <p>Write the relational algebra expressions for the following queries</p> <ol style="list-style-type: none"> List the first and last name of patients whose primary doctor has an experience of more than 10 years List the first and last name of doctors who are primary doctors to at least one patient. List the first name of patients who have medicines prescribed to them on 30/03/2023 by doctors who specialized in 'cardiology'. For each medicine trade, list the trade names and total number of units prescribed on 31/03/2023 	7
c	<p>Given the tables</p> <p>Suppliers(sid: integer, sname: string, address: string)</p> <p>Parts(pid: integer, pname: string, color: string)</p> <p>Catalog(sid: integer, pid: integer, cost: real)</p> <p>The domain of each field is listed after the field name. The sid is the key for Suppliers, pid is the key for Parts, and sid and pid together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers.</p> <p>State as sentences what the following queries compute:</p> <ol style="list-style-type: none"> $\pi_{sname}(\pi_{sid}((\sigma_{color='red'} Parts) \bowtie (\sigma_{cost < 100} Catalog)) \bowtie Suppliers)$ $\pi_{sname}(\pi_{sid}((\sigma_{color='red'} Parts) \bowtie (\sigma_{cost < 100} Catalog) \bowtie Suppliers))$ $(\pi_{sname}((\sigma_{color='red'} Parts) \bowtie (\sigma_{cost < 100} Catalog) \bowtie Suppliers)) \cap$ $(\pi_{sname}((\sigma_{color='green'} Parts) \bowtie (\sigma_{cost < 100} Catalog) \bowtie Suppliers))$ 	7

Q.no.	MODULE 3	Marks
5.a	What is a correlated nested query? Give an example	3
	Answer b or c	
b	<p>Consider the following relational schema. An employee can work in more than one department;</p> <p>Emp(<i>empid</i>: integer, <i>name</i>: string, <i>age</i>: integer, <i>salary</i>: real) Works(<i>empid</i>: integer, <i>did</i>: integer, <i>pct time</i>: integer) Dept(<i>did</i>: integer, <i>dname</i>: integer, <i>budget</i>: real, <i>managerid</i>: integer)</p> <p>Write SQL queries to</p> <ol style="list-style-type: none"> 1. Find the <i>names</i> of managers who manage the departments with the highest budget 2. Display the name of all employee who works in both accounting department and finance department. 3. Display the name of all employee whose salary exceeds the budget of all of the departments that he or she works in. 4. If a manager manages more than one department, he or she controls the sum of all budgets for those departments. Find managerids of managers who control more than 50 lakh. 	7
c	<p>For the schema given in question 5.b</p> <ol style="list-style-type: none"> 1. Write an assertion so that each employee must have an minimum salary of Rs 10000/- 2. Write an assertion to make sure that every manager must also be an employee. 3. Write an assertion to make sure that an employee must always have a lower salary than the budget of the department that he works for. 4. Create a view which contains department names and number of employees working in the department for all departments who have more than 10 employees and have a minimum budget of 10 lakh. 	7