P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY		
BRANCH : Computer Science & Engineering		**REGULATION : PVP20**
Course: B.Tech	**SUBJECT : Database Management Systems**	
SubjectCode: 20CS3502		**Year and Semester: III-I**
QUESTION BANK		

UNIT I

Q. NO.	QUESTION	CO	LEVEL
1	Explain the advantages of using a DBMS and the characteristics that a good database should possess.	CO1	L2
2	Illustrate the client-server architectures for DBMS	CO1	L2
3	Write short notes on categories of Data Models	CO1	L2
4	a) Explain i) Data Independence ii) Database Schema b) Differentiate procedural and non-procedural DMLs	CO1	L2
5	Demonstrate the three schema architecture for database systems with a neat diagram	CO1	L2
6	a) Explain the history of database applications b) Compare Centralized and Client Server Architecture for DBMS	CO1	L2
7	a) Explain about database system utilities b) Discuss different types of user interfaces	CO1	L2
8	Explain Database system environment with a neat diagram	CO1	L2
9	a) What is logical data independence and why is it important. b) What are the types of languages a database system provides? Explain.	CO1	L2
10	Define DBMS. What are the applications of DBMS? Write the history of DBMS.	CO1	L2

UNIT II

Q. NO.	QUESTION	CO	LEVEL
1	a) Draw an ER Diagram for the University database b) Discuss the design issues of ER diagrams?	CO4	L3
2	a) Construct and explain E-R diagram of an Airline reservation system? b) Discuss the two types of participation constraints?	CO4	L3

3	Sketch ER diagram that describes the functionalities of online Banking Database with entities, attributes and relationships among entities.	CO4	L3
4	a)Draw an ERD containing the Order and Customer entity types connected by a 1-M relationship from Customer to Order. Choose an appropriate relationship name using your common knowledge of interactions between customers and orders. Define minimum cardinalities so that an order is optional for a customer and a customer is mandatory for an order. For the Customer entity type, add attributes CustNo (primary key), CustFirstName, CustLastName, CustStreet, CustCity, CustState, CustZip, and CustBal (balance). For the Order entity type, add attributes for the OrdNo (primary key), OrdDate, OrdName, OrdStreet,OrdCity, OrdState, and OrdZip. b) Extend the ERD from problem 1 with the Employee entity type and a 1-M relationship from Employee to Order. Choose an appropriate relationship name using your common knowledge of interactions between employees and orders. Define minimum cardinalities so that an employee is optional to an order and an order is optional to an employee. For the Employee entity type, add attributes EmpNo (primary key), EmpFirstName, EmpLastName, EmpPhone, EmpEmail, EmpCommRate (commission rate), and EmpDeptName	CO4	L4
5	A university registrar's office maintains data about the following entities: (a) COURSES- including number, title, credits, syllabus, and prerequisites; (b) COURSE OFFERINGS- including course number, year, semester, section number, instructor(s), timings, and classroom; (c) STUDENTS- including student-id, name, and program; (d) INSTRUCTORS - including identification number, name, department, and title. Further, the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled. Construct an E-R diagram for the registrar's office. Determine the mapping constraints for the given scenario.	CO4	L4
6	Analyze the given database application scenario to draw the ER diagram representing conceptual design of the database. A database is to be designed for a medium sized Company dealing with industrial applications of computers. The Company delivers various products to its customers ranging from a single application program through to complete installation of hardware with customized software. The Company employs various experts, consultants and supporting staff. All personnel are employed on long- term basis, i.e. there is no short-term or temporary staff. Although the Company is somehow structured for administrative purposes (that is, it is divided into departments headed by department managers) all projects are carried out in an inter-disciplinary way. For each project a project team is selected, grouping employees from different departments, and a Project Manager (also an employee of the Company) is appointed who is entirely and exclusively responsible for the	CO4	L4

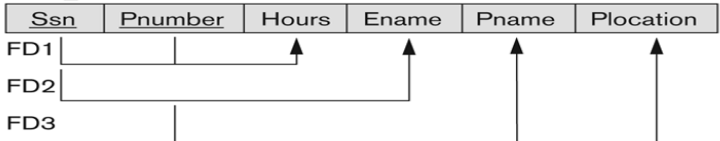|	control of the project, quite independently of the Company's hierarchy. The following is a brief statement of some facts and policies adopted by the Company. • Each employee works in some department. • An employee may possess a number of skills • Every manager (including the MD) is an employee • A department may participate in none/one/many projects. • At least one department participates in a project. • An employee may be engaged in none/one/many projects • Project teams consist of at least one member.		
7	Analyze the given database application scenario to draw the ER diagram representing conceptual design of the database. The relations and associations for the management of a hospital are discussed below. Whenever a new patient is either admitted or comes for outdoor checkup, a unique patient id is generated after storing the name, address and date of birth of the patient. For further visits, the patient uses his unique id. There are several departments in the Hospital. A department characterized by a unique id, name, floor number and total workers. The doctors have a unique employee id, and their name, address, contact number, qualifications are stored with this id. Similarly other workers like nurses, ward boys, ambulance drivers also have a unique employee id. Also each worker is characterized by name, address and type. Doctors and workers can be associated with multiple departments with different schedules. Whenever a patient is admitted in the hospital various details are recorded. The patient id, name and address are stored, the department number and name in which the patient is admitted along with the bed number and room number is also stored. Also for every patient, a senior doctor and junior doctor are appointed. The details of the doctors, like name, id, contact number is recorded. The prescribed medicines are also stored for a patient. In case of outdoor check-ups, the patient id is stored, along with the department number, the employee id of the doctor, the prescription and the date of check-up. For emergency duty every night, the employee_id of doctor and the nurse is stored along with the date.	CO4	L4
8	Elaborate the weak entity with an example and briefly describe Binary Vs Ternary relationships.	CO4	L2
9	Discuss the following terms: i) Relationship instance ii) Composite attribute iii) Multivalued attribute iv) Derived attribute	CO4	L2
10	Construct ER diagram for Library Management System. Identify entities, roles, weak entity sets if any	CO4	L3

UNIT III

Q. NO.	QUESTION	CO	LEVEL
1	a)Consider the following table and answer queries in SQL ORDERS(ORD_NUM, ORD_AMOUNT, ORD_DATE, CUST_CODE) i) List the Customers who placed order 'O101'	CO2	L3

	ii) List the orders placed between 1st January 2015 and 30th January 2018 iii) Change the CUST_CODE of ORD_NUM 'O105' to 'C1004' b) Explain the use of key Constraints with examples.		
2	Answer the following relational algebra queries using the given relation schema. EMP(Name, SSN, Address, Bdate, Salary, Dno) Dept(Dno, Dname, Loccation, Mgr_ssn) i) Retrieve the SSN and Bdate of Department 4 employees ii) Retrieve the Name of the employees who have salary greater than 25000 and belongs to Department 4 or salary greater than 30000 and belongs to Department 5 iii) Retrieve the names of employees working in 'Research' Department iv) Retrieve the names of mangers	CO2	L3
3	Consider the following relations for a database that keeps track of automobile sales in a car dealership (OPTION refers to some optional equipment installed on an automobile): CAR(serial_no, model, manufacturer, place) OPTION(serial_no, option_name, price) SALE(salesperson_id, serial_no, date, price) SALESPERSON(salesperson_id, name, phone) First, specify the foreign keys for this schema, stating any assumptions you make. Next, populate the relations with a few sample tuples, and then give an example of an insertion in the SALE and SALESPERSON relations that violates the referential integrity constraints and of another insertion that does not.	CO2	L3
4	Consider the SAILOR DATABASE Sailors (sid:string, sname:string, rating:integer, age:real) Boats (bid:integer, bname:string, color:string) Reserves (sid:integer, bid:integer, day:date) Based on the above schemas answer the following queries in SQL. i) List the boats with 'red' color ii) List the sailors with age between 30 and 40 iii) Find the colors of boats reserved by 'Lubber' iv) Find the names of the sailorswho reserves more than two boats	CO2	L3
5	a) Identify relational model constraints for the following Relations : Employee(Eid, Ename, Address, Dno) Department(Dno, dname, location) b) Demonstrate nested queries with examples in SQL	CO2	L3
6	For the following schema write queries in relational algebra Suppliers (sid: integer, sname: string, address: string) Parts (pid: integer, pname: string, color: stirng) Catalog (sid: integer, pid: integer, cost: real) i) Find the Sid's of suppliers who supply red part ii) Find the name of the parts which have been supplied by more than 3 suppliers iii) Find the name of the suppliers who supplied more than 2 parts.	CO2	L3
7	a) What is the use of an integrity constraint? Classify different integrity constraints. b) Demonstrate the SQL constructs to modify the structure of tables, views and to destroy the tables and views? Give examples.	CO2	L2

8	a) Solve the queries using following information.	CO2	L3

Ename	DOB	DOJ	Salary	Comm	DOR
Bobby	06-12-1983	07-08-2005	15000	600	07-08-2055
Akbar	12-01-1970	06-12-1973	20000	1200	06-12-2043
Raj	07-08-1985	12-04-2006	13000	500	12-04-2056
Anil	08-02-1960	07-03-1982	25000	1500	07-03-2032

i) Find total salary of employees from Emp table?
ii) Find months between employee DOJ and DOR from Emp table?
iii)Create a view named new_Salary using the Emp_name, salary from
     existing table?
iv)Arrange Emp_names in ascending and descending order.
b) Discuss nested queries with examples in SQL?

9	Demonstrate the View and how it is different from Table. Explain how a view/table can be created/ destroyed with proper syntax and example.	CO2	L2
10	Describe the join operation and why it is required? With an example, briefly describe outer join, natural join and equijoin.	CO2	L2
11	a)Discuss how each of the following constructs is used in SQL i) triggers ii) aggregate functions b) Classify the Set operators in Relational algebra?	CO2	L2

UNIT IV

Q. NO.	QUESTION	CO	LEVEL
1	Illustrate 1NF, 2NF, 3NF & BCNF with examples.	CO4	L2
2	Consider the following relation: CAR_SALE(Car#, Date_sold, Salesperson#, Commission%, Discount_amt) Assume that a car may be sold by multiple salespeople, and hence {Car#, Salesperson#} is the primary key. Additional dependencies are Date_sold → Discount_amt and Salesperson# → Commission% Based on the given primary key, is this relation in 1NF, 2NF, or 3NF? Why or why not? How would you successively normalize it completely?	CO4	L3
3	Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F ={{A, B}→{C}, {A}→{D, E}, {B}→{F}, {F}→{G, H}, {D}→{I, J}}. What is the key for R? Decompose R into 2NF and then 3NF relations.	CO4	L3
4	Define BCNF. How does it differ from 3NF? Why is it considered a stronger form of 3NF? Give an example	CO4	L3

Q. NO.	QUESTION	CO	LEVEL

5	Consider the relation PLAYER with relational schema
	 PLAYER (Player-no, Player-name, Team-no, Team-color, Coach-no, Coach-name, Player-position, Team-captain) and set of functional dependencies as follows:
	F={Player-no →Player-name, Player-position, Team-no,
	    Coach-no → Coach-name,
	    Team-no → Team-color, Coach-no, Team-captain}
	Determine whether PLAYER relation is in 3NF or not.
		CO4	L3

6	Identify the normal form that is used to remove transitivel dependencies in a relation using an example	CO4	L3
7	Apply 2NF and remove partial dependencies from the following Relation EMP_PROJ 	CO4	L3
8	Consider a relation R(A,B,C,D,E) with the following dependencies: AB -> C, CD -> E , DE -> B Is AB a candidate key of this relation? If not, is ABD? Explain your answer	CO4	L3
9	What is FD? Explain Transitive and Partial Dependencies with examples.	CO4	L2
10	a)Briefly describe about multi-valued dependencies and Fourth Normal Form. b)Discuss Fifth Normal form	CO4	L2

UNIT V

Q. NO.	QUESTION	CO	LEVEL
1	a) Describe transaction support in SQL? b) How do you explain Two phase locking to guarantee Serializability.	CO1	L2
2	a) Describe the properties of Transactions b) Discuss about Two Phase locking Technique	CO1	L2
3	Compare Immediate update and Deferred update techniques for recovery	CO1	L2
4	Discuss how Serializability is used to enforce concurrency control in a database system	CO1	L2
5	a)How does a shadow directory work? b)Explain the concept of binary locks	CO1	L2
6	What is serializability? Explain conflict-serializable schedules with examples?	CO1	L2

7	a)Define the concept of schedule for a set of concurrent transaction. Give a suitable example. b) What do you understand by checkpoint? What actions are involved while taking a checkpoint	CO1	L2
8	a)What do you understand by a transaction? In what situation a transaction is said to be committed or aborted?	CO1	L2
9	a)Describe the four levels of isolation in SQL b)Explain the shadow paging recovery scheme	CO1	L2
10	Explain Two Phase Locking for concurrency control with example	CO1	L2

(Signature of HOD)