Reg.No.	1	2	2	1	5	88

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF TECHNOLOGY, PUNE – 411037.
(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

Examination: ESE

Year: 2023-24 **Branch**: SYCommon-CS/ENTC/IC/AI/IT/CS-AIML

Subject: Database Management Systems **Subject Code:** CS2227

Max. Marks: 60 **Total Pages of Question Paper:** 02

Day & Date: Thu. 23/11/23 **Time**: 10:30am - 12:30pm

Instructions to Candidate

1. All questions are compulsory.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right indicate full marks.

Q. N.	CO No	BT* No		Max marks
Q. 1.	1	1,2	A] Define Data Independence. Explain concept of Data Abstraction with suitable example.	4
	1	3	B] Design database for the Company using an ER model concepts like all types of entities, attributes ,relationships and considering the constraints given below– • Company has different departments. • Departments are managed by Employees. • Different department works on different projects which are managed by employees. • Each Employee works under supervision of supervisor and has dependents which are liable to get medical facilities from company.	6
Q. 2.	2	2	A] Explain distinctions among the terms Primary key, Foreign key, candidate key and super key.	4
	2	1	B] i] What is Multivalued functional dependency?	2
	2	4	ii] Analyze and justify whether following relation is in 1NF. If no, Normalize it to 1NF.	4

FULL NAMES	PHYSICAL ADDRESS	MOVIES RENTED	SALUTATION
Janet Jones	First Street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.
Robert Phil	3rd Street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.
Robert Phil	5th Avenue	Clash of the Titans	Mr.

			OR	
	2	4	B] ii] Analyze and Justify whether following relation is in 3NF. R(ABCD) where Functional Dependency given as {AB→ CD, D→A}	6
Q. 3.	3	5	A] Consider following schema: account (acct-no, branch - name, balance) Depositor (cust - name, acct - no) borrower (cust-name, loan-no) loan (loan - no, branch - name, amount)	6

			Write following queries using SQL (any 3) i) Find the names of all branches in the loan relations, and remove duplicates. ii) Find the name, loan number and loan amount of all customers having a loan at the Perryridge branch. iii) Find average account balance at each branch. iv) Find all customers with a loan, an account, or both.	
	3	6	B] Explain about different DML operations.	4
Q. 4.	5	1	A] What is Transaction? Draw and explain Transaction State diagram.	6
			OR	
	5	1	A] What is the two-phase locking protocol? How does it guarantee serializability?	6
	5	2	B] State and explain file structure and indexing concepts related to database storage.	4
Q. 5.	4	2	A] Explain parallel database system along with its architectural models.	6
	4	1	B] What do you mean by Intra query and Inter query Parallelism?	4
Q. 6.	6	2	A] Explain following terms: i] No SQL Databases ii] OLAP	6
	6	1	B] Explain architecture and components of data warehouse in short.	4

CO Statements:

CO1: Design data models as per data requirements of an organization
CO2: Synthesize a relational data model up to a suitable normal form
CO3: Develop a database system using relational queries and PL/SQL objects
CO4: Apply indexing techniques and query optimization strategies
CO5: Understand importance of concurrency control and recovery techniques
CO6: Adapt to emerging trends considering societal requirements

Blooms Taxonomy (BT) Level No:

1. Remembering; 2. Understanding; 3. Applying; 4. Analyzing; 5. Evaluating; 6. Creating