MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL

A Constituent unit of MAHE, Manipal

IVSEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)
GRADE IMPROVEMENT / MAKE UP EXAMINATIONS, JULY 2021

SUBJECT: DATABASE SYSTEMS [CSE 2251]

REVISED CREDIT SYSTEM
(13/08/2021)

Time: 2 Hours   MAX. MARKS: 40

Instructions to Candidates:

❖ Answer any **FOUR** full questions.
❖ Missing data may be suitably assumed.

1A.	You are the admin of the Data Repository of 'MIT-Manipal 'where the information of the employees is stored and maintained using file processing system. Explain any five of the drawbacks of such a system to your higher authority to replace it with DBS by giving suitable justification and examples?	**5**
1B.	With a neat diagram and an example, explain the concept of data abstraction.	**5**
2A	Consider the following schema: Employee(Fname,Mname,Lname,<u>Essn</u>,bdate,address,salary,Dnumber) Department (Dname, <u>Dnumber,</u> HOD_ssn, HOD_start_date) Dependent(<u>Essn,Dependent_name</u>,gender,Relationship) write relational algebra expressions for the following questions: 　i. Find the Fname,Lname and address of all employees who work for the "Computer Science" department. 　ii. Find the average salary of employees in each department 　iii. List the names of all department HOD's who have no dependants.	**5**
2B.	Consider the relational schema for a travel agency system as given below: Tourist (cust_id, name, aadhar, age) Transportation_mode (vehicle_id, driver_id, type) Agent (id, rating, cust_id) Booking (booking_status, payment_status, cust_id, scheme) Travel_details (cust_id, no_of_days, source, destination) In the schema type can take values car, flight, bus or train and scheme can take values be gold, silver, platinum or NULL. Answer the following queries in relational algebra. 　i.　List the customer's name and age who are travelling to Himachal Pradesh from Bengaluru. 　ii.　Find the travel agent with highest number of customers mapped and having	**5**

	highest rating. iii. List the senior citizens (age>=60) have registered in the Gold scheme. iv. List the customers who have not enrolled in any scheme	

3A.	Consider the relational schema for a travel agency system as given below:
	Tourist (cust_id, name, aadhar, age)
	Transportation_mode (vehicle_id, driver_id, type)
	Agent (agent_id, rating, cust_id)
	Booking (booking_status, payment_status, cust_id, scheme)
	Travel_details (cust_id, no_of_days, source, destination)
	In the schema type can take values car, flight, bus or train and scheme can take values be gold, silver, platinum or NULL. Payment status ca take values 0 (not paid), 1 (partly paid) or 2 (fully paid).
	 Write SQL queries for the following questions.
	   i. Find the customers who have selected the agent 101 for their travel plans and have not done any down payment.
	  ii. Assuming a friend is travelling from 'Bengaluru' as a starting point, find the destinations where people stay for more number of days.
	 iii. List the agent with least rating without using aggregate function.
	  iv. List the customer details with name ending with 'ath'.
		5

3B	Consider the schema as given below and write the queries given using SQL
	       Customer= (customer-name, customer-street, customer-city)
	       Borrower = (customer-name, loan-number)
	       Account = (account-number, branch-name, balance)
	       Depositor= (customer-name, account-number)
	   i. Find all customers who have an account but no loan at the bank.
	  ii. Find the average balance for each customer who lives in Harrison and has at least three accounts.
	 iii. Find all branches where the total account deposit is less than the average of the total account deposits at all branches
		5

4A	Consider a PARTS_ORDER database in which employees take orders for parts from customers. The data requirements are summarized as follows: The PARTS_ORDER company has employees, each identified by a unique employee number, first and last name, and Zip Code. Each customer of the company is identified by a unique customer number, first and last name, and Zip Code. Each part sold by the company is identified by a unique part number, a part name, price, and quantity in stock. Each order placed by a customer is taken by an employee and is given a unique order number. Each order contains specified quantities of one or more parts. Each order has a date of receipt as well as an expected ship date. The actual ship date is also recorded. Design an Entity-Relationship diagram for the PARTS_ORDER database.	**5**
4B.	List the mapping rules by which a database that conforms to an ER diagram can be represented by a collection of relational schemas. Convert the E-R diagram in Figure 4B into an appropriate set of relations.	**5**

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Fig. 4B.

5A.	Consider the relation R (A, B, C, D, E,F) with the functional dependencies F = {A → C, C → D, D → B, E → F}
	
	    (i) Find all the candidate keys of R.
	    (ii) Is R in BCNF? If not, then decompose it into BCNF.
		(1+4=5)

5B.	Find the canonical cover for the given a relational Schema R=(XYZ) and a set of functional dependencies F = {X→YZ, Y →Z, X →Y, XY →Z,XZ→Y}.	**5**
6A.	Explain ACID properties with suitable examples with respect to banking scenario.	**5**
6B	Suppose that we are using extendable hashing on file that contains records with the search-key values:4, 6, 7, 10, 14, 22, 26, 34, 35, 38, 46, 58 Construct the extendable hash structure for this file if the hash function is h(x) = x mod 7 and each bucket can hold three records.	**5**