CLASS: BTECH   SEMESTER : IV
BRANCH: CSE   SESSION : SP/2024

SUBJECT: CS237 DATABASE MANAGEMENT SYSTEMS
TIME: 02 Hours   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. **Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	The typical *file-processing system* is supported by a conventional operating system. Keeping organizational information in a *file-processing system* has a number of major disadvantages. Mention any five such disadvantages and briefly discuss any two of these.	[2]	01	01
Q.1(b)	A database system provides a data-definition language (DDL) to specify the database schema and a data-manipulation language (DML) to express database queries and updates. Create your own example schema to demonstrate the syntax and/or applicability of any four commands falling under these two categories.	[3]	01	02
Q.2(a)	The *cardinality* of a *relationship set* is decided by the count of entities participating in it. Give an example *ternary relationship set*. Justify, why your design should not be replaced by binary relationship sets.	[2]	02	03
Q.2(b)	A cricket tournament among 6 countries is being held at New Delhi. The participating countries are India, Pakistan, Sri Lanka, Australia, New Zealand, and England. Each country has team of 15 players, a coach, and a manager. The team has a captain, vice-captain, and a wicket keeper. Out of 15 players only 11 of them play in any match and not all players play in each match. A database is being created to keep track of the performance of the players. Design an *ER model* for the abovementioned requirements. Do not use ternary relationships, instead go for alternative design approaches. All the participation and mapping constraints should be specified in the model designed by you. Use of descriptive attribute(s) (if any) must be justified. You can make your assumptions, if necessary.	[3]	02	03
Q.3(a)	Consider the employee database given below. : *employee* (*person_name*, *street*, *city*) :*works* (*person_name*, *company_name*, *salary*) : *company* (*company_name*, *city*) Give an expression in the *relational algebra* to express each of the following queries: - Find the name of each employee who lives in city "Ahmedabad". - Find the name of employees whose salary is greater than Rs. 50,000/.	[2]	01	02
Q.3(b)	SQL supports a number of different integrity constraints. The *primary key*, *foreign key*, and *not null* are a few of such constraints. Discuss the relevance of these constraints using a suitable database schema.	[3]	01	02
Q.4(a)	Consider the relational database given below, where the primary keys are underlined. Give an expression in SQL for each of the following queries. : *employee* (*ID*, *person_name*, *street*, *city*) : *works* (*ID*, *company_name*, *salary*) : *company* (*company_name*, *city*) : *manages* (*ID*, *manager_id*) - Assume that companies may be located in several cities. Find the name of each company that is located in every city in which "Small Bank Corporation" is located. - Find the name of the company that has the most employees (or companies, in the case where there is a tie for the most).	[2]	02	02

Q.4(b) For database schema in question 4(a), give an expression in SQL for each of the following queries.   [3]   02   02
- Find ID and name of each employee who earns more than the average salary of all employees of her or his company.
- Find the company that has the smallest payroll.

Q.5(a) Using a suitable schema discuss the various anomalies associated with a bad database design.   [2]   02   02

Q.5(b) Decomposing a large schema into possibly a number of smaller ones is often suggested as a remedy to data redundancy problem leading to a bad database design. However, a decomposition done carelessly, upon subsequent join, may result in more tuples but less information. Justify this statement with help of a suitable example.   [3]   02   04

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