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Daffodil International University

Department of Information Technology & Management

Faculty of Science & Information Technology

Final Examination, Summer 2025

Course Code: ITM 221; Course Title: Database Managemnt Systems

Sections & Teachers: NJ(A)

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	Consider the following Schema and Solve with SQL for the following questions: Project (P_ID, Project_Name, Manager, Budget) Employee (E_ID, Employee_Name, Address, Department_No) Department (Departnemt_No, Department_Name, Location) Emp_Timehour (P_ID, E_ID, Hour_Rate) 1. Find the names of employees who worked on the project with the highest budget. 2. List all projects managed by the same manager who manages the project named 'AI System'. 3. Find the total hours worked (sum of Hour_Rate) by employees on each project. 4. Find the average budget of all projects. 5. Find all projects with a budget between 50,000 and 100,000.	[Marks-10]	CLO-3 *Level-3*
2.	Imagine you want to withdraw money from an ATM. You provide all the required details, and the system asks for the withdrawal amount. You input the amount and confirm the process. However, during this process, an error occurs, and the transaction does not complete. Consider the above situation. Explain the states of the transaction by drawing a state diagram. Also, explain how the system maintains consistency in this case.	[Marks-5]	CLO-5 *Level-2*
3.	a. Apply the concepts of insert, update, and delete anomalies to justify the need for normalization with relevant examples.	[Marks-6]	CLO-4 Level-4

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Purchased Artworks

ArtID	Art Title	ArtistNo	Artist Name	Artist Phone	Purchase Date	Sales Price
A001	Laugh with Teeth	03	Carol Channing	245-3562	09/17/2000	7000
A003	South toward Sea	15	Dennis Frings	245-3250	05/11/2000	1800
A004	At the Movies	03	Carol Channing	245-3562	02/14/2002	5550

Consider the given schema and answer the following questions

b. List the normalization rules sequentially [Marks-3] CLO-4 Level-4

c. Normalize the table from 1NF up to 3NF; examining every step of the process with proper explanation. [Marks-8]

4. Outline ERD from the result of Normalization that you solve in Q.3.c. [Marks-4] CLO-2 *Level-4*

Book

Book_id	Title	Author_name	Genre	Price	Published year
B101	The Great Gatsby	F. Scott Fitzgerald	Classic	$120	1965
B103	Brave New World	Aldous Huxley	Mystery	$60	1932
B104	Pride and Prejudice	Jane Austen	Romance	$50	2022

Customer_Purchase

Customet_id	Customer_name	Book_id	Purchase_amount
C101	Emily Brown	B101	120
C101	Emily Brown	B103	60
C103	Alice Smith	B105	50

5. Show the results of inner join, full outer join for the schema **Book** and **Custmer_Purchase.** [Marks-4]