



Daffodil International University

Department of Information Technology & Management

Faculty of Science & Information Technology

Final Examination, Fall 2025

Course Code: ITM 221; Course Title: Database Management 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.	Imagine you want to make a payment using your credit card at a point-of-sale (POS) terminal or an online payment gateway. You provide all the <u>required details</u>, such as card number, expiry date, CVV, and OTP (if required). The system then asks for payment confirmation. You confirm the transaction, but during processing, <u>an error occurs</u> (for example, network failure or insufficient credit limit), and the transaction does not complete. Identify the different states of the credit card transaction by drawing a state diagram. Explain how the system maintains transaction consistency and prevents incorrect charges or data corruption in this failure scenario.	[Marks-5]	CLO-5 Level-4																																
2.	a. Apply the concepts of insert, update, and delete anomalies to justify the need for normalization for the Project Billing Receipt. Project Billing Receipt Project No: 1001 Project Name: Class Monitoring System Dept No: 35 Dept Location: Ashulia, Dhaka Bill No: 405 Bill Date: 12/01/22 Dept Name: Marketing <table><thead><tr><th>EmployeeNo</th><th>Name</th><th>Responsibility</th><th>Phone</th><th>Salary</th><th>ManagerId</th><th>Manager name</th><th>Manageremail</th></tr></thead><tbody><tr><td>800</td><td>Arif Rahman</td><td>Analyst</td><td>017888</td><td>2222</td><td>M101</td><td>Lira</td><td>l@gmail</td></tr><tr><td>801</td><td>Rani</td><td>Developer</td><td>1234445</td><td>4000</td><td>M101</td><td>Lira</td><td>l@gmail</td></tr><tr><td>805</td><td>Afjal</td><td>Developer</td><td>56777</td><td>9000</td><td>M103</td><td>Naima</td><td>Nm@gmail</td></tr></tbody></table> Consider the given schema and answer the following questions b. List the normalization rules sequentially c. Normalize the table from 1NF up to 3NF; examining every step of the process with proper explanation.	EmployeeNo	Name	Responsibility	Phone	Salary	ManagerId	Manager name	Manageremail	800	Arif Rahman	Analyst	017888	2222	M101	Lira	l@gmail	801	Rani	Developer	1234445	4000	M101	Lira	l@gmail	805	Afjal	Developer	56777	9000	M103	Naima	Nm@gmail	[Marks-6]	CLO-4 Level-4
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		[Marks-3]	CLO-4 Level-4																																
		[Marks-8]																																	

3.	Draw ERD from the result of Normalization that you solve in Q.2.c.								[Marks-4]	CLO-3 Level-3
	Table: Student				Table: BookBorrow					
	studentID	studentName	dept	batch	borrowID	studentID	bookName	borrowDate	BorrowCharge	
	101	Arefin	CSE	46	B001	101	Database Design	12/10/2022	100	
	102	Maria	ITM	45	B002	101	AI for Beginners	15/10/2022	100	
	103	Tamim	CSE	47	B003	103	Cloud Computing	20/10/2022	500	
	104	Sabila	ITM	46	B004	103	Web Technologies	22/10/2022	700	
4	Show the results of inner join, full outer join for the schema Student and BookBorrow.								[Marks-4]	
5	Solve those problem for the schema Student and BookBorrow								[Marks-10]	CLO-3 Level-3
	a) List all students from ITM department. b) Delete the borrowing record of "Web Technologies". c) Find student name whose name starts with T. d) Find the number of student in each department. e) Find those student name whose borrowed charge greater than Arefin's borrowed charge. f) Find the average charged amount of CSE department students. g) Find the student name who borrowed at 22/10/2022. h) Find student list of batch 46.									