



Daffodil International University
Faculty of Science & Information Technology
Department of Computing and Information System
Final Examination, Fall-2025

Course Code: CIS222, Course Title: Database Management System
Level: 2 Term: 2

Exam Duration: 2 Hours

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.	(a)	What is a tuple in a relational database?	[2]	CO1 L-1,2
	(b)	Briefly explain the comparative analysis of <i>PRIMARY KEY</i> , <i>FOREIGN KEY</i> , <i>UNIQUE</i> and <i>NOT NULL</i> constraints in DDL.	[4]	
	(c)	Why are Keys required in DBMS? Identify the possible <i>super keys</i> , <i>candidate keys</i> , <i>primary key</i> , and <i>alternate keys</i> for the following schema: Library_books (BookID, ISBN, Title, Author, Publisher)	[5]	

2.	(a)	In the Fall 2025 semester, the course coordinator of the CIS department is offering a variety of courses for students. From the course list, the following students have selected the courses mentioned, as detailed in Table 01.	[8]	CO3 L-1,2,4																																	
		<table border="1"> <thead> <tr> <th>Stu_ID</th><th>Stu_Name</th><th>Course_Name</th><th>Instructor_Name</th><th>Phone_Numbers</th></tr> </thead> <tbody> <tr> <td>242-16-005</td><td>Shimu</td><td>DBMS</td><td>MH</td><td>0134567890, 0145678901</td></tr> <tr> <td>242-16-009</td><td>Samiul</td><td>COF</td><td>SHM</td><td>0176789012</td></tr> <tr> <td>242-16-020</td><td>Tawfiqur</td><td>DBMS</td><td>MH</td><td>0168901234, 0139012345</td></tr> <tr> <td>242-16-041</td><td>Kamrul</td><td>AI, DBMS</td><td>DMR, MH</td><td>0131234567</td></tr> <tr> <td>242-16-046</td><td>Payal</td><td>DBMS</td><td>MH</td><td>0169876540, 0191234560</td></tr> <tr> <td>242-16-075</td><td>Airin</td><td>COF, AI</td><td>SHM, DMR</td><td>0170123456</td></tr> </tbody> </table> Table 01: Course_Registration <i>Now, display the result of each step in the normalization process (up to 3NF)</i>	Stu_ID		Stu_Name	Course_Name	Instructor_Name	Phone_Numbers	242-16-005	Shimu	DBMS	MH	0134567890, 0145678901	242-16-009	Samiul	COF	SHM	0176789012	242-16-020	Tawfiqur	DBMS	MH	0168901234, 0139012345	242-16-041	Kamrul	AI, DBMS	DMR, MH	0131234567	242-16-046	Payal	DBMS	MH	0169876540, 0191234560	242-16-075	Airin	COF, AI	SHM, DMR
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	(b)	Why are JOIN operations required in DBMS? Write down the differences between NATURAL JOIN and INNER JOIN.	[4]																																		

3.

In the last year, 1,500 students were admitted to the Faculty of Science and Information Technology (FSIT) at DIU. The admissions office has recorded the required information for all students, and the details of the first seven are presented in the following table.

Admission_ID	Student_Name	Dept_Name	Session	Admissio_Fee	Merit_Position
A101	Rayhan	CIS	Spring-25	150000	12
A102	Shehabaul	CIS	Fall-24	135000	25
A103	Tanzil	CSE	Spring-25	150000	5
A104	Tasnim	SWE	Fall-24	120000	18
A105	Aman	CSE	Summer-25	145000	33
A106	Arif	CIS	Spring-25	135000	20
A107	Azmam	SWE	Summer-25	125000	10

Table 02: DIU_Admission

Write the SQL queries for the following tasks based on Table 02:

- I. Find the Second Highest Admission Fee
- II. Show the top 3 students with the lowest merit position
- III. Increase AdmissionFee by 5000 for all CIS students
- IV. Departments having more than 1 student
- V. Show students from CSE and CIS only
- VI. Add a new column "ContactNumber"

[9]

CO3
L-3,5

4.

(a) Please carefully read the following scenario:

Mr. Abir transfers 7,000 Taka from his account to Rifad's account using a mobile banking app. The amount is deducted from Abir's account, but due to a system crash, it is not added to Rifad's account.

Which transaction property is violated? Explain your answer.

[3]

CO2
L-
2,3,4

(b) **Mr. Fahim**, a student of the CIS department, wants to develop a database for the *Online Shopping System*. Before implementing the database, he needs to design an ER diagram based on the following scenario.

An online shop manages customers, orders, and products. A customer can place multiple orders. Each order can contain multiple products, and each product can appear in many orders. Quantity is stored for each product in an order.

Now, visualize an ER diagram that is designed by Mr. Fahim. Make sure to capture the constraints on the relationships involved, and designate appropriate primary keys for the entities.

[5]

MAX-1