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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 *PRIMARY KEY*, *FOREIGN KEY*, *UNIQUE* and *NOT NULL* constraints in DDL.	[4]	
	(c)	Why are Keys required in DBMS? Identify the possible *super keys*, *candidate keys*, *primary key*, and *alternate keys* 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

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	0170123456

Table 01: Course_Registration

Now, display the result of each step in the normalization process (up to 3NF)

	(b)	Why are JOIN operations required in DBMS? Write down the differences between NATURAL JOIN and INNER JOIN.	[4]	

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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.		[9]	CO3 L-3,5

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	Azmain	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"

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