



Daffodil International University
Department of Information Technology & Management
Faculty of Science & Information Technology
Mid Examination, Fall 2025

Course Code: ITM 221; Course Title: Database Management Systems
Sections & Teachers: All

Time: 1.30 Hrs

Marks: 25

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.	An online Learning Management System (LMS) is used by a university to manage courses, <u>students</u> , <u>instructors</u> , and <u>resources</u> . The university has several <u>departments</u> , each identified by a unique <u>department ID</u> , <u>name</u> , and <u>location</u> . Each department offers multiple <u>courses</u> , and each course is identified by a <u>course ID</u> , <u>name</u> , <u>credit hours</u> , and <u>description</u> . <u>Instructors</u> are assigned to departments and are identified by an <u>instructor ID</u> , <u>name</u> , <u>email</u> , <u>phone number</u> , and the department they belong to. Each instructor can teach multiple courses, and each course is taught by one instructor. <u>Students</u> are identified by a <u>student ID</u> , <u>name</u> , <u>email</u> , <u>phone number</u> , and the department they are enrolled in. Students can enroll in multiple courses, and each course can have many students enrolled. Each course has <u>resources</u> such as <u>lecture notes</u> , <u>videos</u> , and <u>assignments</u> , identified by a <u>resource ID</u> , <u>type</u> , <u>title</u> , and <u>upload date</u> . Resources are uploaded by instructors and are accessible to students enrolled in the course. The system also <u>tracks grades</u> for each student in a course, including the <u>student ID</u> , <u>course ID</u> , and <u>grade</u> (e.g., A, B, C), as well as <u>student progress</u> , such as the percentage of course material completed.																						
	a)	Describe the schema for the LMS system above.	[Marks-2]	CLO-1 Level-4																			
	b)	Analyze the three levels of abstraction for the LMS system	[Marks-4]																				
	c)	Examine the key responsibilities of a Database Administrator in ensuring data integrity and consistency when managing in the company's database?	[Marks-2]																				
	D)	Discuss how the three-tier architecture can be implemented for this system.	[Marks-2]																				
2.	a)	Consider the question 1's scenario. Illustrate an ERD identifying their entity, attributes & relationship.	[Marks-5]																				
	b)	Consider the following Schema and Solve with Relational Algebra for the following questions. Student <table><thead><tr><th>StudentID</th><th>Name</th><th>Email</th><th>Phone</th><th>DepartmentID</th></tr></thead><tbody><tr><td>101</td><td>John Doe</td><td>john@example.com</td><td>1234567890</td><td>1</td></tr><tr><td>102</td><td>Jane Smith</td><td>jane@example.com</td><td>9876543210</td><td>2</td></tr><tr><td>103</td><td>Alice Lee</td><td>lee@example.com</td><td>5555555555</td><td>1</td></tr></tbody></table>	StudentID		Name	Email	Phone	DepartmentID	101	John Doe	john@example.com	1234567890	1	102	Jane Smith	jane@example.com	9876543210	2	103	Alice Lee	lee@example.com	5555555555	1
StudentID	Name	Email	Phone	DepartmentID																			
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103	Alice Lee	lee@example.com	5555555555	1																			

Course					
CourseID	CourseName	CreditHours	StudentID		
C101	Database Systems	3	101		
C102	Web Development	4	102		
C103	Data Structures	3	101		
Solve relational algebra for the following questions.					
1. Retrieve the names and emails of all students in the DepartmentID = 1.					
2. Find the student Id who yet not enrolled in any course.					
3. List the CourseID and CourseName of courses					
4. Retrieve the CourseName of courses with CreditHours > 3.					
5. Find the Name and Phone of students who take Database Systems course.					
3.	a)	Solve SQL command to express each of the following queries:		[Marks-5]	CLO-3 Level-3
		I. Write two constraints with example			
		II. Create one tables using key constraints			
		III. Define data type with example			
		IV. Add a new column Emp_salary in the employee table using the alter command and Project_start_date in the Project table.			