

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.	Scenario 1: Library Management System:		
	A public library has several branches across different cities in Bangladesh. Each branch is identified by a <u>unique branch number</u> , along with its <u>street</u> , <u>city</u> , <u>state</u> , <u>zip code</u> , and <u>phone number</u> . The daily operations of the branch are managed by a <u>librarian</u> or a team of staff, each assigned a <u>staff number</u> , <u>name</u> , <u>position</u> , and <u>salary</u> . Each branch maintains a collection of books. Information stored for each book includes a <u>catalog number</u> , <u>book number</u> , <u>title</u> , <u>genre</u> , <u>daily rental fee</u> , <u>cost</u> , <u>availability status</u> , and the names of the <u>authors</u> and <u>publisher</u> . Multiple copies of the same book can be found at a branch, and individual copies are distinguished using the <u>book number</u> . Before borrowing a book, individuals must register as library members by providing their <u>member number</u> , <u>first</u> and <u>last name</u> , <u>address</u> , and the <u>date</u> they joined the library. Once registered, a member can borrow up to five books at a time. For each borrowed book, details such as <u>rental number</u> , <u>member name</u> and <u>number</u> , <u>book number</u> , <u>title</u> , <u>rental fee</u> , and the <u>dates borrowed</u> and <u>returned</u> are recorded. A <u>unique rental number</u> tracks all transactions across the library network.		
	a)	Identify schema for the above mentioned scenario 1.	[Marks-4]
	b)	Analyze the three levels of abstraction for the library management system	[Marks-3]
2.	c)	Examine the key responsibilities of a Database Administrator in ensuring data integrity and consistency when managing in the company's database?	[Marks-3]
	a)	Define relational database	[Marks-1]
	b)	From this scenario 1, point out candidate key, primary key, alternate key, foreign key with explanation.	[Marks-4]
	c)	Consider the following Schema and Solve with Relational Algebra for the following questions. Branch (<u>branch_number</u> , street, city, state, zip_code, phone_number) Staff (<u>staff_number</u> , name, position, salary, branch_number) Video (<u>catalog_number</u> , video_number, title, category, daily_rental, cost, status, branch_number) Member (<u>member_number</u> , first_name, last_name, address, registration_date, branch_number)	[Marks-5]

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| | <ul style="list-style-type: none"> a) Find staff name whose salary greater than 50000 b) Retrieve the street and zip code for all branches that have a branch number greater than 'B050' c) Find out the first names and last names of members who are registered at branches with a branch number 'B101' and 'B102'. d) Retrieve the title and category of all videos that have a daily rental fee greater than 30. e) Find all members who registered in the year 2023. | |
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| 3. | <p>a) Solve SQL command to express each of the following queries:</p> <ul style="list-style-type: none"> 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. | [Marks-5] |
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