



Daffodil International University
Faculty of Science & Information Technology
Department of Computing and Information System
Final Examination, Summer 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)	List three significant differences between a file-processing system and a DBMS.	[3]	CO1 L-1,2
	(b)	What is a candidate key in a relational database, and how does it differ from a primary key? Give an example.	[3]	
	(c)	Consider the following relation schema. If each student can enroll in multiple courses and each course can have multiple students, which key(s) would you define as the primary key? <i>Relation Schema: StudentCourses(StudentID, CourseID)</i>	[2]	

2. (a)

Unnormalized Table (Student Management Systems)

Enroll_ID	Student_ID	Student_Name	Dept	Course_Code	Course_Title	Instructor_Name	Instructor_Con_tact
301	S01	Arif	CSE	CSE101	Database Systems	Dr. Karim	181111111
302	S02	Nabila	CSE	CSE101	Database Systems	Dr. Karim	181111111
303	S01	Arif	CSE	CSE202	Data Structures	Dr. Rahman	182222222
304	S03	Tanvir	EEE	EEE105	Circuit Analysis	Dr. Alam	183333333
305	S02	Nabila	CSE	CSE202	Data Structures	Dr. Rahman	182222222
306	S04	Meghla	BBA	BBA110	Principles of Management	Dr. Hasan	184444444

Display the result of each step in the normalization process (up to 3NF), and provide the data dictionary for each resulting table.

(b)

Differentiate between Natural Join and Inner Join in SQL with proper examples. Highlight how they handle join conditions, output, and control over attributes.

[8]

CO3
L-1,2,4

[4]

3.	(a)	In Summer 2025, 50 new patients registered at a community clinic. The clinic kept basic records; the first six are shown below.	[4]	CO3 L-3,5																																										
<table><tr><th>P ID</th><th>P Name</th><th>Gender</th><th>Age</th><th>District</th><th>Phone</th></tr><tr><td>25-001</td><td>ARMAN</td><td>M</td><td>20</td><td>Dhaka</td><td>01709890986</td></tr><tr><td>25-002</td><td>NADIA</td><td>F</td><td>19</td><td>Chittagong</td><td>01824543257</td></tr><tr><td>25-003</td><td>SUMON</td><td>M</td><td>21</td><td>Sylhet</td><td>01609856789</td></tr><tr><td>25-004</td><td>RIMA</td><td>F</td><td>27</td><td>Rajshahi</td><td>01767556498</td></tr><tr><td>25-005</td><td>TAREQ</td><td>M</td><td>22</td><td>Khulna</td><td>01876509873</td></tr><tr><td>25-006</td><td>MUNNA</td><td>F</td><td>18</td><td>Dhaka</td><td>01387653980</td></tr></table> Table 02: Patient_Information Write the SQL DDL & DML for three Patient records, enforcing appropriate integrity constraints for all attributes.					P ID	P Name	Gender	Age	District	Phone	25-001	ARMAN	M	20	Dhaka	01709890986	25-002	NADIA	F	19	Chittagong	01824543257	25-003	SUMON	M	21	Sylhet	01609856789	25-004	RIMA	F	27	Rajshahi	01767556498	25-005	TAREQ	M	22	Khulna	01876509873	25-006	MUNNA	F	18	Dhaka	01387653980
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	(b)	Write the SQL queries for the following tasks based on Table 02. I. Find the patient(s) with the highest age. II. Increase Age by 3 for patients under 20. III. Find the patient(s) phone number who uses the “Robi Sim Operator”. IV. Find patients whose age is between 19 and 23.	[8]																																											

4.	(a)	Explain what a derived attribute is in a database, and illustrate your answer with a real-world example.	[3]	CO2 L-2,3,4
	(b)	<i>An online bookstore wants to create a database to manage its inventory, customer information, and sales. This system will track books, customers, and orders. The business has identified the following requirements:</i> <i>Customers can place orders, and a customer can place many orders.</i> <i>An order can contain one or more products (books).</i> <i>A book can have one or more authors, and an author can write multiple books.</i> <i>Now, visualize an ER diagram that will be designed by you. Make sure to capture the constraints on the relationships involved, and designate appropriate primary keys for the entities.</i>	[5]	