International Islamic University Chittagong (IIUC)

Department of Computer and Communication Engineering

Final Examination

Program: **B.sc (Engg.)**
Course Code: **CCE–3505**
Total Marks: **50**

Semester: **Autumn 2022**
Course Title: **Database Management Systems**
Time: **2 Hours 30 Minutes**

(i) Answer all the questions. The figures in the right-hand margin indicate full marks.
(ii) Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns.

Course Learning Outcomes (CLOs) of the Questions	
CLO1	Understand and learn design principle of robust and large-scale databases.
CLO2	Understand the transaction management in DBMS.
CLO3	Understand the security and access control in DBMS.

Bloom's Levels of the Questions						
Letter Symbols	**R**	**U**	**Ap**	**An**	**E**	**C**
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

Q1. a) Write short notes on following SQL Constraints: **CLO2 An 10**

1. Primary key
2. Foreign key
3. Unique

Your answer should include but not limited to the following

- Definition of each constraint with example
- How to create table using SQL with each constraint

OR

Q1. a) Design an E/R diagram for a database of documents, authors, and readers. The database has the following entities and relationships: **CLO1 E 10**

• **Document:** has a docID (the key), title.

• **Section:** each document consists of several sections; each a section has a title, and a number (1, 2, 3, . . .). The section number is unique within each document.

• **Author:** each author is the creator of several documents. Each document was created by exactly one author.

• **Reader:** each reader reads several documents, and each document is read by several readers.

• **Person:** has name, address. Authors and readers are persons.

Q2. a) Write a stored procedure *iTopUp* to recharge your account from *eWallet* to your *Mobile* account. *eWallet* and *Mobile* and are two relational databases that you can design by yourself but each database must have two mandatory fields *accountNo* and b*alance*. **CLO2 C 5**

b) Create a trigger for the above stored procedure *iTopUp* that will insert a row in *RechargeHistory* table whenever Mobile's *balance* is increased after recharge. Again, you can consider any arbitrary schema for the *RechargeHistory* relation. **CLO2 C 5**

Part B

Q3.	**a)**	List the ACID properties. Explain the usefulness of each.	**CLO2**	**Ap**	**4**
	b)	During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur.	**CLO2**	**Ap**	**3**
	c)	Why do database systems support concurrent execution of transactions, de- spite the extra effort needed to ensure that concurrent execution does not cause any problems?	**CLO2**	**An**	**3**
Q4.	**a)**	What are the approaches to provide security in database management systems?	**CLO3**	**R**	**3**
	b)	Write SQL statements to create three users: Bob, Adam, John and three roles: Student, Teacher, Admin	**CLO3**	**U**	**2**
	c)	Write SQL statements to assign roles to Bob, Adam, John respectively as : Student, Teacher, Admin.	**CLO3**	**Ap**	**2**
	d)	Grant all teachers to modify the Course data but Student only to select data.	**CLO3**	**C**	**3**
Q5.	**a)**	Create and modify a Database based on the information provided in figure 1. You have to perform at least the following activities using SQL on the database. • create a database • create tables for the database • insert data on the tables • update data of the tables • drop tables • delete the created database	**CLO2**	**C**	**10**

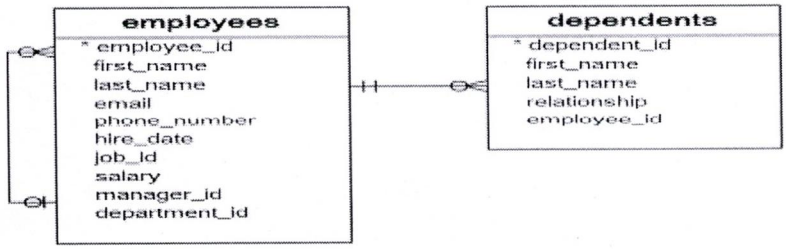

Figure 1: employees and dependents table

OR

Q5.	**a)**	Why do we need normalization in database design?	**CLO2**	**Ap**	**3**
	b)	Explain 1NF, 2NF, 3NF with examples.	**CLO2**	**An**	**7**