UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BCS1423
COURSE	: DATABASE SYSTEM
SEMESTER/SESSION	: 1 / SEPTEMBER – 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Define the Database and Database Management System (DBMS). (4 marks)

b) Explain **TWO (2)** limitations of file system. (4 marks)

c) List **THREE (3)** advantages of Database Management System (DBMS). (3 marks)

QUESTION 2

a) Describe the derived attributes. (2 marks)

b) Table 1 shows the car rental information in First Normal Form (1NF). Illustrate the process of normalizing the data shown in Table 1 as per below requirements:

Table 1: Car Rental Information

PlateNo	Model	PriceDay	CusID	CusName	PhoneNo	RentDate	ReturnDate	TotalCost
TBX1011	Axia 1.0	60	A100	Umar	0199112676	20/2/2022	23/2/2022	240
TCD2022	Vios G	120	A103	Humaira	0127382920	25/2/2022	26/2/2022	240
TAA1967	City	120	A104	Ainul	0129099111	25/2/2022	28/2/2022	480
TDD3092	CRV	180	A100	Umar	0199112676	27/2/2022	27/2/2022	180
TBX1011	Axia 1.0	60	A101	Nuha	0185627381	1/3/2022	5/3/2022	300
TDD3092	CRV	180	A103	Humaira	0127382920	1/3/2022	5/3/2022	900
TBX1011	Axia 1.0	60	A105	Irfan	0111098567	3/3/2022	4/3/2022	120
TDX8880	CRV	180	A100	Umar	0199112676	3/3/2022	4/3/2022	360
TCC1023	Axia 1.0	60	A101	Nuha	0185627381	3/3/2022	5/3/2022	180
TBX1011	Axia 1.0	60	A105	Irfan	0111098567	5/3/2022	9/3/2022	300

i. Complete dependency diagram. (3 marks)

ii. List of partial and transitive dependency. (3 marks)

iii. Second Normal Form (2NF). (3 marks)

iv. Third Normal Form (3NF). (3 marks)

c) Draw a complete Entity Relationship Diagram (ERD) based on 3NF answer in Question 2 (b). (8 marks)

QUESTION 3

a) Explain the function of the following SQL commands:

i. CREATE TABLE (1 mark)

ii. DROP (1 mark)

iii. ALTER (1 mark)

iv. DELETE (1 mark)

v. UPDATE (1 mark)

vi. COMMIT (1 mark)

vii. ROLLBACK (1 mark)

b) Write the SQL statements for the given questions based on the following tables in Figure 1:

Table: Student

StudID	StudName	PhoneNo
00101	Uzair	019-8911010
00102	Abu Bakar	013-5679023
00103	Humaira	017-5679011
00104	Umar	019-1109167
00105	Muhammad	012-4567914

Table: Enrollment

EnrollID	RegisterDate	StudID	CourseID	Grade
001	12/11/2023	00101	01	A
002	12/11/2023	00101	02	B+
003	12/11/2023	00101	03	A-
004	13/11/2023	00103	02	C
005	13/11/2023	00104	03	A
006	13/11/2023	00104	04	A-

Table: Course

CourseID	CourseName	Credit
01	Database System	3
02	Programming	3
03	English	2
04	Calculus	4

Figure 1: Academic Database

i. Display all courses that has 3 credits. (2 marks)

ii. Display all students' records ordered by StudName. (2 marks)

iii. Display the list of StudName, PhoneNo, CourseName, RegisterDate and Grade. (5 marks)

iv. Insert new student data as per following Table 2.

Table 2: New Student Data

StudID	StudName	Phone
00106	Irfan	013-9119876

(2 marks)

v. Update the phone number of student belongs to '00102' to '019-9123890'. (2 marks)

vi. Delete the EnrollID record of EnrollID '004'. (2 marks)

QUESTION 4

a) Explain **SIX (6)** stages in database lifecycle. (12 marks)

b) List **TWO (2)** factors of selecting the Database Management System (DBMS) software. (2 marks)

c) Explain the function of indexes. Describe **THREE (3)** factors of selecting the attribute for index. (8 marks)

QUESTION 5

a) Explain **FIVE (5)** transaction properties. (10 marks)

b) List **THREE (3)** main problems in concurrency control. (3 marks)

c) Supposed that a rental shop rent books to their customer. Each customer may rent more than one book in a time. The entity relational diagram (ERD) shown in Figure 2. Each time the book rented by the customer the status will be set as 'ON LOAN'. Otherwise, the status will be set as 'AVAILABLE'. The duration rental is set to only 7 days.

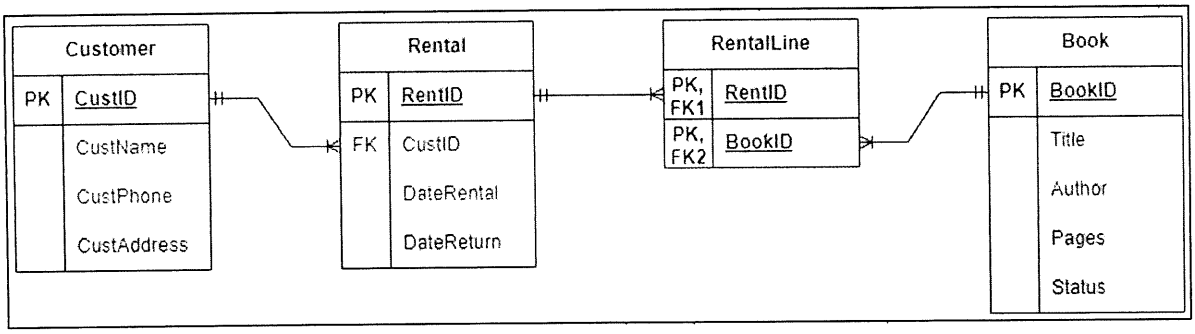

Figure 2: Entity Relational Diagram

Assume that customer 'C0020' has made a rental for two books on '20/11/2023' for book ID 'B1004' and 'B2098'. The rental ID is 'R00019'. Write **FIVE (5)** SQL statements to make the changes to the above transaction.

(10 marks)

----------End of question----------