UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: FCT1083
COURSE	: FUNDAMENTALS OF DATABASE
SEMESTER/SESSION	: III - 2024/2025
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 7 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Identify **FOUR (4)** processes that need to be done in phase of database initial study. (4 marks)

b) Explain **THREE (3)** types of relationship. (6 marks)

c) Differentiate between B-Tree index, Hash index and Bitmap index in relational database. (6 marks)

d) Determine **THREE (3)** compulsory elements that need to be in Entity Relationship Diagram (ERD). (3 marks)

QUESTION 2

a) List **FIVE (5)** stages in system development lifecycle. (5 marks)

b) Define Information System. (2 marks)

c) Distinguish between entity integrity and referential integrity. (4 marks)

d) Describe partial dependency and transitive dependency. (4 marks)

QUESTION 3

a) Identify **THREE (3)** types of anomalies that can happen to the database that has too much redundancy. (3 marks)

b) Write the business rules based on an ERD diagram given below:

i.

ii.

iii.

(6 marks)

c) Table 1 shows the sample of report layout in first normal form. Illustrate the process of normalizing the table shown in Table 1 as per below requirements:

Table 1: Report Layout

PROJ_NUM	PROJ_NAME	EMP_NUM	EMP_NAME	JOB_CLASS	CHG_HOUR	HOURS
15	Evergreen	103	June E. Arbough	Elect. Engineer	84.50	23.8
15	Evergreen	101	John G. News	Database Designer	105.00	19.4
15	Evergreen	105	Alice K. Johnson *	Database Designer	105.00	35.7
15	Evergreen	106	William Smithfield	Programmer	35.75	12.6
15	Evergreen	102	David H. Senior	Systems Analyst	96.75	23.8
18	Amber Wave	114	Annelise Jones	Applications Designer	48.10	24.6
18	Amber Wave	118	James J. Frommer	General Support	18.36	45.3
18	Amber Wave	104	Anne K. Ramoras *	Systems Analyst	96.75	32.4
18	Amber Wave	112	Darlene M. Smithson	DSS Analyst	45.95	44.0
22	Rolling Tide	105	Alice K. Johnson	Database Designer	105.00	64.7
22	Rolling Tide	104	Anne K. Ramoras	Systems Analyst	96.75	48.4
22	Rolling Tide	113	Delbert K. Joenbrood *	Applications Designer	48.10	23.6
22	Rolling Tide	111	Geoff B. Wabash	Clerical Support	26.87	22.0
22	Rolling Tide	106	William Smithfield	Programmer	35.75	12.8
25	Starflight	107	Maria D. Alonzo	Programmer	35.75	24.6
25	Starflight	115	Travis B. Bawangi	Systems Analyst	96.75	45.8
25	Starflight	101	John G. News *	Database Designer	105.00	56.3
25	Starflight	114	Annelise Jones	Applications Designer	48.10	33.1
25	Starflight	108	Ralph B. Washington	Systems Analyst	96.75	23.6
25	Starflight	118	James J. Frommer	General Support	18.36	30.5
25	Starflight	112	Darlene M. Smithson	DSS Analyst	45.95	41.4

i. Draw and 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). (2 marks)

d) Draw the Entity Relationship Diagram (ERD) based on 3NF answer in Question 3(c). (5 marks)

QUESTION 4

a) Write SQL command to create table **STAFF** as per the following table schema. Set the StaffID as a Primary Key and cannot be NULL. Define proper data type and size for each attribute.

StaffID	StaffName	Address	Email	DOB

(8 marks)

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

Table: Student

StudentID	StudentName	DOB	ProgCode	FacID
00101	Syamimi	22/06/1998	FIT	02
00102	Naim	01/01/1994	BCET	03
00103	Syazwani	16/02/2000	BCET	03
00104	Umair	31/12/1990	BCSC	01
00105	Muhaimin	19/03/1985	BCSC	01
00106	Daniel	02/04/2002	BCNS	01

Table: Program

ProgCode	ProgName
BCSC	Bachelor Computer Science
BCNS	Bachelor Networking
FIT	Foundation Information Technology
BCET	Bachelor Chemical

Table: Faculty

FacID	FacName
01	FKMPT
02	PPPA
03	FTK

Figure 1: Tables

i. List all records of Student. (1 mark)

ii. Display all students records order by StudentID. (2 marks)

iii. Using join, list StudentD, StudentName, DOB, ProgName and FacName. (5 marks)

iv. Update the ProgCode of StudentID belong to '00103' to 'FIT'. (3 marks)

v. Delete all student from the Bachelor Chemical program. (2 marks)

vi. Delete table Faculty. (1 mark)

c) Figure 2 shows many to many relationships. Many to many relationships is prohibited in relational model.

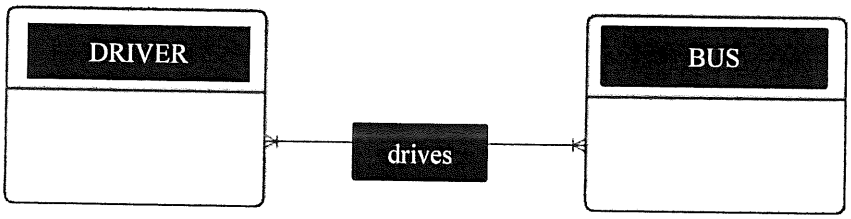

Figure 2: Many to many relationships

i. Discuss how to solve this problem. (2 marks)

ii. Draw the initial ERD to support your answer in c (i). (3 marks)

QUESTION 5

a) Distinguish between connectivity and cardinality. (4 marks)

b) Describe about normalization. (4 marks)

c) Identify **SIX (6)** types of keys used in database. (6 marks)

----------End of questions----------