PENINSULA COLLEGE GEORGETOWN DK266-03(P)

FINAL EXAMINATION

Semester	:	**SEPTEMBER 2025 SEMESTER**
Programme Name	:	**DIPLOMA IN COMPUTER SCIENCE** **DIPLOMA IN E-BUSINESS TECHNOLOGY**
Course Code & Name	:	**DCS2233 | DEB2113 DATABASE MANAGEMENT SYSTEM**
Duration	:	**3 HOURS**

INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY.**
2. The question paper consists of **FOUR (4)** questions.
3. Answer **ALL** questions in the question paper.
4. Answers to the questions are to be written into the examination booklet.
5. Electronic dictionaries, lecture notes, files or any unauthorised materials except writing equipment are strictly prohibited.

This question paper must be submitted along with all used and/or unused rough papers and/ or graph papers (if any). Candidates are **NOT ALLOWED** to take any examination paper(s) used or unused out of the examination hall.

WARNING:

The Examination Board of Peninsula College Georgetown regards cheating as a very serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed, and in accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

(*This booklet contains 4 printed pages including this page*)

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

Answer **ALL** questions on the separate sheet provided. **[100 marks]**

1. a) Describe the difference between a primary key and a foreign key. Provide an example to support your explanation. (7 marks)

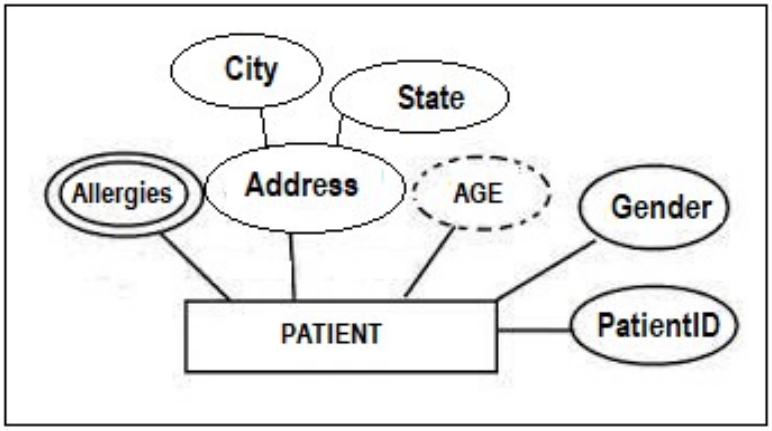

Figure 1

b) Based on **Figure 1**, identify the type of attribute for the following attributes:

i) PatientID (2 marks)

ii) Allergies (2 marks)

iii) AGE (2 marks)

iv) Address (2 marks)

c) A **library system** needs to track **Books**, **Members**, and the **Loans** of books to members. Each book has a **BookID**, **Title**, and **Author**. Each member has a **MemberID**, **Name**, and **Phone**. When a member borrows a book, the system records the **LoanDate** and **ReturnDate**.

i) Describe any **TWO (2)** key components of Entity-Relationship (ER) modeling. (4 marks)

ii) Identify and list **THREE (3)** entities and their relevant attributes. (6 marks)

Total: [25 marks]

2. a) In a DBMS, relationships between entities can be classified as one-to-one (1:1)**,** one-to-many (1:M)**,** or many-to-many (M:N). For each of the following scenarios, identify the type of relationship set and briefly justify your answer.

i) Each manager is assigned to one company car, and each company car is assigned to one manager. (4 marks)

ii) A customer can place many orders, but each order is placed by one customer. (4 marks)

iii) Students can enrol in multiple courses, and each course can have multiple students. (4 marks)

b) In database design, relationship sets describe how entities are related to one another. These can be unary**,** binary**,** or ternary**.** Illustrate simple diagram to represent the relationship set for the following scenario:

i) An employee supervises another employee. (3 marks)

ii) A student enrols in a course. (4 marks)

iii) A supplier supplies a part to a project (6 marks)

Total: [25 marks]

3. a) Design the output of First Normal Form (1NF) based on the denormalized database table shown in **Table 1**. (14 marks)

Student Name	**Hobbies**
Alice Wong	Chess, Reading
Jessy Tan	Badminton, Swimming
Bryan Lim	Running, Tennis

Table 1

b) Based on **Table 2 (Students table)** below, write SQL statements for the following scenarios:

StudentID	**Name**	**Age**	**Major**
101	Ali	21	Computer Science
102	Siti	22	Information Systems
103	John	20	Data Science
104	Emily	23	Business Analytics
105	Kumar	21	Computer Science
106	Aisyah	21	Cybersecurity
107	Marcus	22	Data Science

Table 2

i) Insert a new student into the Students table with the following data:

- StudentID: 108
- Name: 'Ahmad'
- Age: 21
- Major: 'Computer Science' (6 marks)

ii) Update the major of the student with StudentID 101 to 'Data Science'. (5 marks)

Total: [25 marks]

4. a) Describe any **THREE (3)** database security mechanisms. (9 marks)

b) The ACID model defines four essential properties that guarantee the reliability and consistency of database transactions. Explain in detail the **FOUR (4)** key properties of ACID and how each contributes to maintaining data integrity. (12 marks)

c) Explain the difference between a shared lock and an exclusive lock in concurrency control. (4 marks)

Total: [25 marks]

- END OF QUESTIONS -