

## FINAL SEMESTER EXAMINATION

Programme	:	<b>DIPLoma IN COMPUTER SCIENCE DIPLoma IN E-BUSINESS TECHNOLOGY</b>
Course	:	<b>DATABASE MANAGEMENT SYSTEM</b>
Course Code	:	<b>DCS2233/DEB2113</b>
Duration	:	<b>3 Hours</b>

### INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY**.
2. This 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 the 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**

For examiner's use only

QUESTION NO.	MARKS
1	/ 25
2	/ 25
3	/ 25
4	/ 25
<b>Total</b>	<b>/ 100</b>

Answer **ALL FOUR (4)** questions on the separate sheet provided.

**[100 marks]**

1. a)

Draw an Entity-Relationship Diagram by using **Crow's Foot**. Below are the business rules of the University database that stores details about university students, courses, the semester a student took a particular course (and his mark and grade if he completed it), and what degree program each student is enrolled in.

*Note: Identify relationship, cardinality, attributes, primary key, foreign key if any.*

(20 marks)

- The university offers one or more programs. A program is made up of one or more courses.
- A student enrolls in a program. A program has more than one student.
- Each student takes one or many courses. Each course consists of more than one student.
- A program has a name, a program identifier, the total credit points required to graduate, and the year it commenced.
- A course has a name, a course identifier, a credit point value, and the year it commenced.
- Students have one given name, a surname, a student identifier, and the year they first enrolled.

b) Identify the relational scheme based on the Entity-Relationship Diagram in **Q1 (a)**.

(5 marks)

Total: [25 marks]

2. a) There are several problems that may arise when designing a conceptual data model. These are known as connection traps which normally occur due to misinterpretation of the meaning of a certain relationship. State and explain the **TWO (2)** main types of connection traps.

(5 marks)

b) Repayment(borrower\_id, firstname, lastname, address, loanamount, requestdate, repayment\_date, repayment\_amount)

- i) Write an SQL request that returns all the tuples with information on repayments from the borrower with id equal to 89, and where the lent amount exceeds 1200 MYR.

(3 marks)

- ii) Write an SQL request that for each address finds the total repaid amount for the address. (3 marks)
- iii) Write an SQL request that lists the records with a repayment date after 20/08/2019 and displays the results in ascending order of the first name of repayment. (3 marks)

c) Employee (EmployeeID, EmployeeName, EmployeeDept, EmployeePosition, Sex, Experience)

Salary (Sal\_ID, SalBasic, SalAllowance)

- i) Write an SQL command that displays the maximum allowance of employees. (3 marks)
- ii) Write an SQL command that displays the basic salary of the employee that is at least 3000 and whose name starts from 'SA'. (4 marks)
- iii) Write an SQL command that returns all tuples of Employee details who have an allowance. (4 marks)

Total: [25 marks]

3. The table below shows the sample data for the Member Dinner Table. Based on the table below, answer the following questions.

MemberNo	MemberName	MemberAdd	DinnerNo	DinnerDate	VenueCode	VenueDesc	FoodCode	FoodDesc
214	Peter Wong	325, Jalan Penang	D001	15/9/2021	B001	BallRoom	EN3	Westem Food
214	Peter Wong	325, Jalan Penang	D001	15/9/2021	B001	BallRoom	DE8	Fast Food
235	Mary Lee	123, Jalan Macalister	D002	20/3/2021	B002	Auditorium	S01	Pizza
300	Paul Tan	9, Arena Curve	D003	20/3/2021	B003	Café	DE2	Buffet

- a) Explain the table shown above in at least First Normal Form (1NF). (3 marks)
- b) Convert the above Member Dinner Table into First Normal Form (1NF) table. (3 marks)
- c) Identify **THREE (3)** functional dependencies based on the First Normal Form (1NF) in **Q3 (b)**. (6 marks)

d) Based on the First Normal Form (1NF) in **Q3 (c)**, identify the Second Normal Form (2NF). (6 marks)

e) Based on the Second Normal Form (2NF) in **Q3 (d)**, identify the Third Normal Form (3NF). (7 marks)

Total: [25 marks]

4. a) Explain **THREE (3)** techniques that are used to overcome deadlocks. (6 marks)

b) Define the term below.  
i) Serializability (2 marks)

ii) Encryption of Database Security (2 marks)

iii) Recovery Manager of Recovery Management (2 marks)

c) Define concurrency control. State **TWO (2)** potential problems of concurrency control. (5 marks)

d) As a Database Analyst, you are required to design a database for Student Enrollment System. Identify the relational schema which includes **FOUR (4)** entities and attributes for this store. (8 marks)

*Note: Identify the primary key and foreign key.*

Total: [25 marks]

**- END OF QUESTIONS -**