UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2023/2024

COURSE NAME	:	DATABASE
COURSE CODE	:	DAT 20103
PROGRAMME CODE	:	DAT
EXAMINATION DATE	:	JANUARY/FEBRUARY 2024
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER ALL QUESTIONS
		2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **NINE (9)** PAGES

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SECTION A (20 MARKS)
Instruction: Identify whether each of the following statements is TRUE or FALSE.

Q1   In a database, data is stored in spreadsheets with rows and columns.

Q2   E.F. Codd created the relational database model.

Q3   Applications are programs that interact directly with the database.

Q4   Testing and evaluation are the third stage in the Database Life Cycle (DBLC).

Q5   Before 1970, all data was stored in separate files, mostly on magnetic tape reels.

Q6   A primary goal of a database system is to share data with multiple users.

Q7   An attribute is a characteristic or property of an entity.

Q8   An Entity Relationship Model (ERM) is dependent on the database type.

Q9   The conceptual level is also termed the logical level.

Q10 Structured Query Language (SQL) is an internationally recognized standard language that is understood by all commercial database management system products.

Q11 The properties of an object are stored as rows in a table.

Q12 A column whose value uniquely identifies a given row in the table is the secondary key.

Q13 Multiple constraints can be included in a single query.

Q14 The primary key does not necessarily have to be unique for a given table.

Q15 For a relation schema R (A, B, C, D), if $AB \rightarrow C$ and $C \rightarrow D$, then AB is a key.

Q16 In view schemas, a particular administrator group can view only the database parts that are relevant to them while hiding the rest of the database.

Q17 In a relation R (A, B, C, D), if $AC \rightarrow CB$, then $A \rightarrow B$.

Q18 Concerning R with attributes ABC, if a Functional Dependency $A \rightarrow B$ holds, then $AC \rightarrow B$ also holds.

Q19 One or more columns of a composite primary (a primary key comprising more than one attribute) can have NULL values.

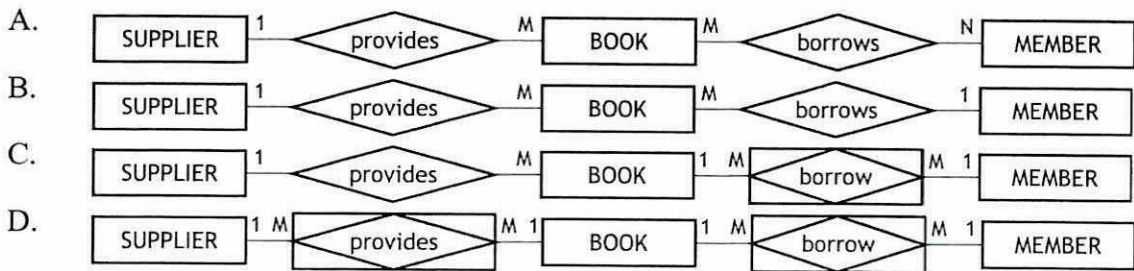**Q20** The word "entity" in the ER model corresponds to a table.

SECTION B (20 MARKS)
Instruction: Choose the correct answer.

Q21 Which SQL function counts the number of rows in a SQL query?
     A.   COUNT( )
     B.   NUMBER( )
     C.   SUM( )
     D.   COUNTBY( )

Q22 What is the basic client/server architecture one has to deal with?
     A.   A large number of PCs
     B.   Web servers
     C.   Database Servers
     D.   All of the above

Q23 A function that has no partial functional dependencies is in _____ form.
     A.   2NF
     B.   3NF
     C.   BCNF
     D.   None of the above

Q24 DBMS transform requests from the conceptual to the internal level through ____ mapping.
     A.   external
     B.   internal
     C.   hidden
     D.   external/conceptual

Q25 What is three schema architecture also known as?
     A.   ANSI/SPARC architecture
     B.   Three-level architecture
     C.   Both A and B
     D.   None of the above

Q26 Which of the following is NOT a SQL keyword or SQL clause?
     A.   INSERT
     B.   UPDATE
     C.   SELECT
     D.   INVERT

Q27 With SQL, how do you select a column named "FirstName" from a table named "Person"?
A. SELECT Person.FirstName
B. SELECT FirstName FROM Person
C. EXTRACT FirtName FROM Person
D. EXTRACT Person.FirstName

Q28 Which of the following is the result of bad database design?
A. Repetition of information
B. Inability to represent some information
C. Inconsistent database state due to some transaction
D. All of the above

Q29 "A supplier provides the library with many books, and one supplier can only provide each book. A member can borrow many books, and each book can be borrowed by a member". Which entity relationship diagram (ERD) best represents the statements above?

A.
| SUPPLIER | 1 —< provides >— M | BOOK | M —< borrows >— N | MEMBER |

B.
| SUPPLIER | 1 —< provides >— M | BOOK | M —< borrows >— 1 | MEMBER |

C.
| SUPPLIER | 1 —< provides >— M | BOOK | 1 M —< borrow >— M 1 | MEMBER |

D.
| SUPPLIER | 1 M —< provides >— M 1 | BOOK | 1 M —< borrow >— M 1 | MEMBER |

Q30 How do you select all the records from a table named "Person" where the value of the column "FirstName" is "Kasthoori"?
A. SELECT * FROM Person WHERE FirstName'Kasthoori';
B. SELECT [all] FROM Person WHERE FirstName LIKE 'Kasthoori';
C. SELECT * FROM Persons WHERE FirstName = 'Kasthoori';
D. SELECT [all] FROM Person WHERE FirstName='Kasthoori';

Q31 Functional dependencies are a generalization of:
A. Key dependencies
B. Relation dependencies
C. Database dependencies
D. None of the above

Q32 Which normal form is considered adequate for the usual database design?
A. 2NF
B. 3NF
C. 4NF
D. 5NF

Q33 The UNION SQL clause can be used with _____.
    A.   the SELECT clause only
    B.   the UPDATE clause only
    C.   the DELETE and UPDATE clauses
    D.   None of the above

Q34 Which Schema is also known as Physical Schema?
    A.   Internal
    B.   Conceptual
    C.   External
    D.   None of the above

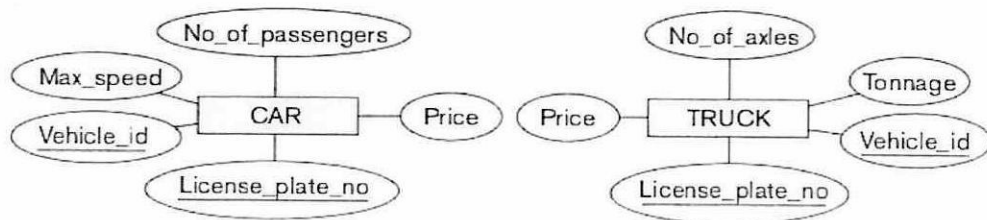**Q35** Choose the **BEST** action that should be carried out based on **Figure Q35**.

Figure Q35

A   Place all attributes from CAR and TRUCK into a VEHICLE entity.
B   Place attributes from CAR and TRUCK into a VEHICLE entity, eliminating distinguishing attributes.
C   Move common attributes from CAR and TRUCK into a VEHICLE entity, and keep distinguishing attributes in their respective entities.
D   Copy common attributes from CAR and TRUCK into a VEHICLE entity and keep all attributes in their respective entities.

Q36 How do you select all the records from a table named "Customer" where the value of the column "FirstName" starts with an "R"?
    A.   SELECT * FROM Customer WHERE FirstName = 'R'
    B.   SELECT * FROM Customer WHERE FirstName LIKE 'R%'
    C.   SELECT * FROM Customer WHERE FirstName LIKE '%R'
    D.   SELECT * FROM Customer WHERE FirstName = '%R%'

Q37 The third normal form is based on the concept of _____.
    A.   Closure Dependency
    B.   Transitive Dependency
    C.   Normal Dependency
    D.   Functional Dependency

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Q38 How many types of mapping are there in database architecture?
A. 1
B. 2
C. 3
D. 4

Q39 "Workers in an organization can send an e-mail and access many websites on the internet, but people outside the organization can only send e-mail to the organization, and they do not have access to the website content of the intranet".
The above statement refers to _____.
A. Internet
B. Extranet
C. Intranet
D. Extended

Q40 Which of the following SQL clauses is used to enter data into a SQL table?
A. INSERT INTO
B. SELECT
C. INSERT
D. UPDATE

SECTION C (60 MARKS)
Instruction: Answer **ALL** the questions.

Q41 (a)   The following **Figure Q41(a)** is the Structured Query Language (SQL) syntax.

> SELECT COUNT (IDCustomer), Country
> FROM Customer
> GROUP BY Country;

Figure Q41(a)

State **TWO (2)** functions of the syntax.

(4 marks)

(b)   **Figure Q41(b)** shows a method of writing Structured Query Language (SQL) to build a Table in the database.

> CREATE TABLE Car_Info
> (ID INT (5) PRIMARY KEY,
> CITY VARCHAR (20),
> STATE VARCHAR (2),
> PLATE_NO VARCHAR (8));

Figure Q41(b)

Based on the table created, write an SQL command to insert the following data into the table.

> ID   : 1
> CITY   : KEDAH
> STATE   : 02
> PLATE_NO   : KFC1111

(7 marks)

(c)   **Figure Q41(c)** shows an Entity Relationship Diagram (ERD) for students who register for the final exam.
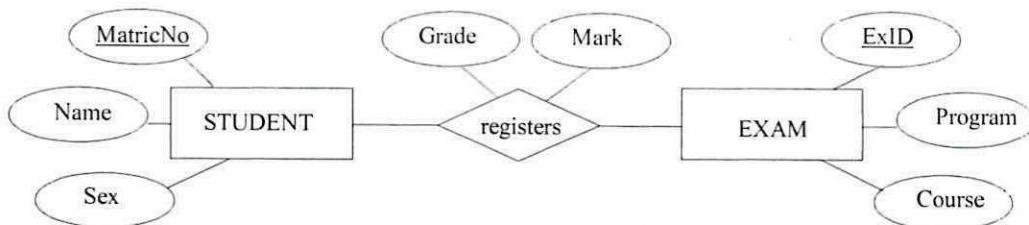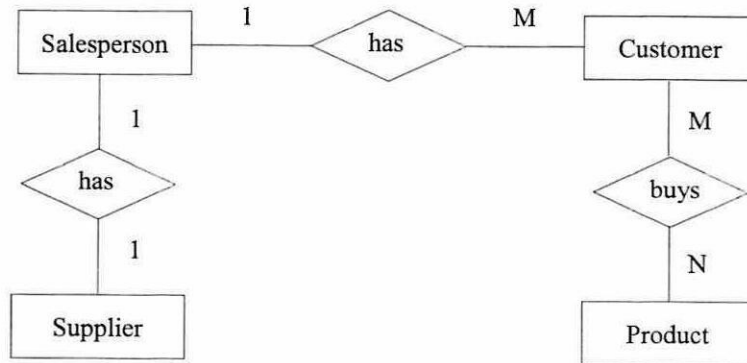

Figure Q41(c)

Based on the ERD above, write a relational scheme.

(13 marks)

(d)   State **THREE (3)** relations between the entities regarding the cardinality as shown in **Figure Q41(d).**

(6 marks)

Q42   (a)   **Table Q42(a)** is a Product Table.

Table Q42(a)

```
+-----------+----------------------+--------------+---------+
| IDProduct | Description          | Category     | Price   |
+-----------+----------------------+--------------+---------+
| P01034    | Fan 16 inches        | Fan          | 125.00  |
| P01189    | LED TV 40 inches     | TV           | 850.00  |
| P04891    | Refrigerator 4 doors | Refrigerator | 5677.00 |
| P12439    | LED TV 32 inches     | TV           | 598.50  |
| P54312    | Fan 16 inches        | Fan          | 139.00  |
| P71892    | FULL HD TV 43 inches | TV           | 1328.80 |
+-----------+----------------------+--------------+---------+
```

Write the Structured Query Language (SQL) for the following questions in the command-line interface (CLI).

(i)   To find the price of the most expensive product.

(5 marks)

(ii)   To calculate the average of the fan price.

(7 marks)

(iii)   To display the information on all the products.

(4 marks)

(b)   The following **Table Q42(b)** shows the customer record for Hotel Rahmah. You are required to generate a normalized relational schema.

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Table Q42(b)

Customer Name	Email	Hp No	Check In	Check Out	Room No	Price (RM)
Syahmina Amani	amani@mail.com	013234576	2/2/21	3/2/23	107(A)	150.00
			5/2/23	6/2/23	107(A)	150.00
			1/3/23	2/3/23	108(A)	150.00
Syahmie Iqbal	iqbal@mail.com	018902356	2/2/23	4/2/23	107(B)	300.00
			1/3/23	2/3/23	108(B)	150.00
Syamseer Irfan	irfan@mail.com	015678123	2/3/23	5/3/23	107(B)	300.00

Construct normalization table:

(i)   1NF

(3 marks)

(ii)   2NF

(11 marks)

-END OF QUESTIONS –