



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2022/2023**

COURSE NAME : DATABASE SYSTEM
COURSE CODE : BIT 20803
PROGRAMME CODE : BIT
EXAMINATION DATE : FEBRUARY 2023
DURATION : 3 HOURS
INSTRUCTION : 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

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

- Q1** _____ refers to the protection of data against accidental or intentional disclosure to unauthorized persons, unauthorized modifications, or destruction. (1 mark)
- A. Consistency
 - B. Data Security
 - C. Accuracy
 - D. Reliability
- Q2** A database is implemented through three general levels: internal, _____, and external so as to cater to the needs of its user. (1 mark)
- A. physical
 - B. logical
 - C. conceptual
 - D. all of the above
- Q3** Within given relations, a set of one or more attributes having values that are uniquely within the relationship and thus are able to uniquely identify that tuple is said to be the _____ key of the relation. (1 mark)
- A. foreign
 - B. candidate
 - C. primary
 - D. candidate
- Q4** _____ is the decomposition of a more complex data structure into relations, this forms the basis of relational databases. (1 mark)
- A. Normalization
 - B. Fragmentation
 - C. Segmentation
 - D. none of the above
- Q5** The _____ is a collection of tables and related views that enables you to see the inner working and structure of the Oracle database. (1 mark)
- A. data
 - B. info
 - C. data dictionary
 - D. none of the above

Q6 SUM(), MIN(), MAX() and COUNT() are the examples of _____ and SQL functions can be categorized into single row functions and _____.

(1 mark)

- A. string functions, multiple row function
- B. single-row functions, aggregate function
- C. character functions, single row functions
- D. aggregate functions, multiple row functions

Q7 Which of the following provides the ability to query information from the database and insert tuples into, delete tuples from, and modify tuples in the database?

(1 mark)

- A. Data Manipulation Language (DML)
- B. Data Definition Language (DDL)
- C. Query
- D. Relational Schema

Q8 Read the query carefully,

```
1. SELECT emp_name
2. FROM department
3. WHERE dept_name LIKE ' _____ Computer Science';
```

In the above-given query, which of the following can be placed in the query's blank portion to select the dept_name that also contains Computer Science as its ending string?

(1 mark)

- A. &
- B. _
- C. %
- D. \$

Q9 A system is in a _____ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.

(1 mark)

- A. idle
- B. waiting
- C. deadlock
- D. ready

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Q10 Which one of the following Structured Query Language (SQL) commands is used for removing a relation from the database?

(1 mark)

- A. Delete
- B. Drop
- C. Remove
- D. All of the above

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- Q11** (a) What is Database Management System (DBMS)? (2 marks)
- (b) Provide **TWO (2)** the needs of Database Management System (DBMS)? (4 marks)
- (c) List **TWO (2)** the advantages and disadvantages of Database Management System (DBMS)? (4 marks)

Q12 Based on **Figure Q12**, write a Structured Query Language (SQL) statement for **Q12(a) – Q13(h)**

emp (<u>eno</u> , ename, bdate, title, salary, dno)
proj (<u>pno</u> , pname, budget, dno)
dept (<u>dno</u> , dname, mgreno)
workson (<u>eno</u> , <u>pno</u> , resp, hours)

FIGURE Q12

- (a) The project number and name for projects with a budget greater than RM100,000. (3 marks)
- (b) All works on records where hours worked is less than 10 and the responsibility is 'Manager'. (3 marks)
- (c) The employees (name only) in department 'D1' ordered by decreasing salary. (3 marks)
- (d) The departments (all fields) ordered by ascending department name. (3 marks)
- (e) The employee name, department name, and employee title. (3 marks)
- (f) The project name, department name, and budget for all projects with a budget < RM50,000. (3 marks)

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- (g) The employee numbers and salaries of all employees in the 'Consulting' department ordered by descending salary. (3 marks)
- (h) The employee name, project name, employee title, and hours for all works on records. (4 marks)

Q13 Design an Entity Relationship (ER) diagram describing the following domain:

- (i) A Person has attributes *pid* (key) and *name*.
- (ii) A Skier is a type of Person with attribute *aptitude*.
- (iii) A Snowboarder is a type of Skier.
- (iv) A *PairOfSkis* has attribute *sid* (key) and *model*.
- (v) A Snowboard has attribute *sid* (key) and *model*.
- (vi) A Skier owns zero or more *PairOfSkis*. The ownership relation has a purchase price. A *PairOfSkis* is owned by at most one Skier.
- (vii) A Snowboarder owns zero or more Snowboards. The ownership relation has a purchase price. A Snowboard is owned by at most one Snowboarder.
- (viii) A Person can rent a *PairOfSkis* or a Snowboard. A person cannot rent more than one *PairOfSkis* or one Snowboard at the same time. A person cannot rent
- (ix) A *PairOfSkis* and a Snowboard at the same time either. A piece of equipment can be rented by at most one person at a time. The rental comes with a start date and an end date.

(20 marks)

Q14 Translate the Entity Relationship (ER) diagram from **FIGURE Q14(a) and Q14(b)** into a reasonable relational database schema.

(a)

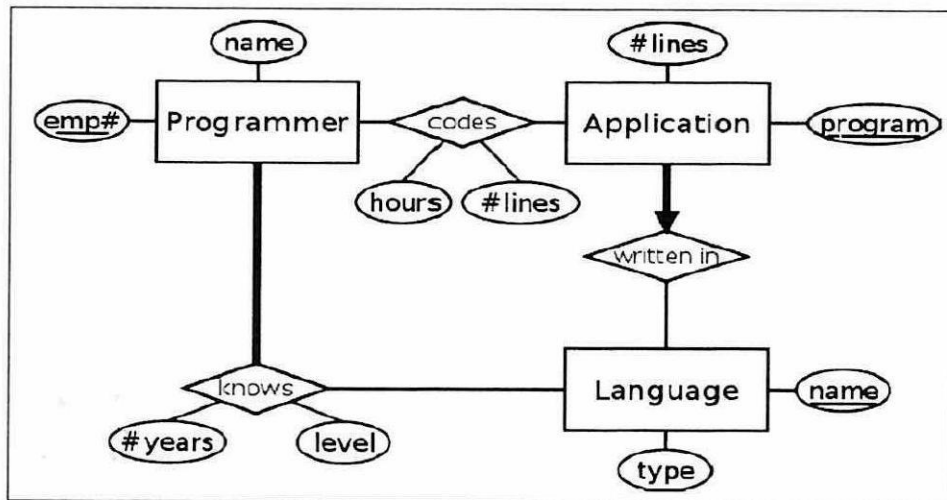


FIGURE Q14(a)

(10 marks)

(b)

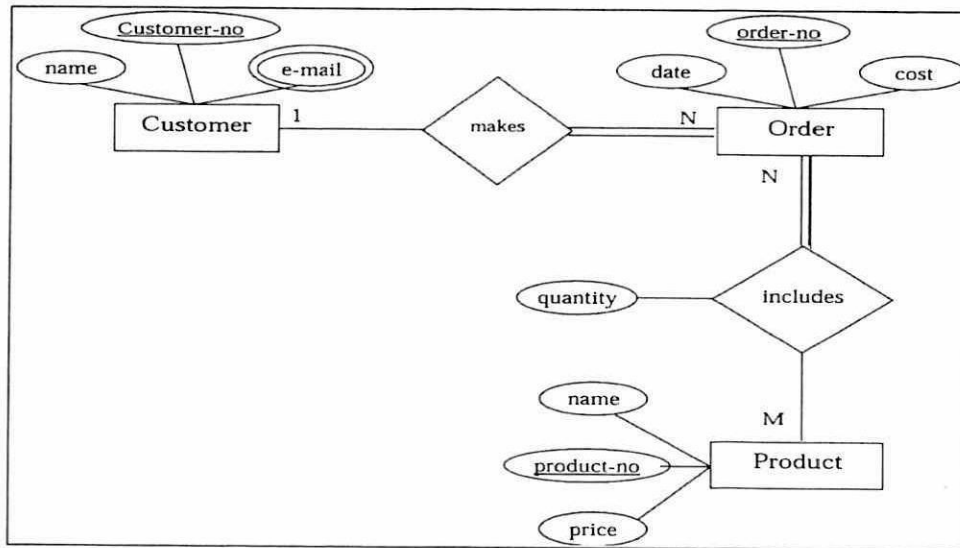


FIGURE Q14(b)

(10 marks)

Q15 Convert each of the following schema to 3rd Normal Form (3NF), showing all intermediate stages, that is, 1st Normal Form (1NF) and 2nd Normal Form (2NF).

```

CLIENT (Client#, Name, Location, Manager#, Manager_name, Manager_location,
(Contract#, Estimated_cost, Completion_date, (Staff#, Staff_name,
Staff_location)))
    
```

(15 marks)

-END OF QUESTIONS -

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