UNIVERSITI
TEKNOLOGI
PETRONAS

FINAL EXAMINATION
MAY 2024 SEMESTER

COURSE	:	**TEB3343 - ENTERPRISE DATA MANAGEMENT AND ANALYSIS**
DATE	:	**6 AUGUST 2024 (TUESDAY)**
TIME	:	**9:00 AM - 12:00 NOON (3 HOURS)**

INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions in the Answer Booklet.

2. Begin **EACH** answer on a new page in the Answer Booklet.

3. Indicate clearly answers that are cancelled, if any.

4. Where applicable, show clearly steps taken in arriving at the solutions and indicate **ALL** assumptions, if any.

5. **DO NOT** open this Question Booklet until instructed.

Note :

    i. There are **SEVEN (7)** pages in this Question Booklet including the cover page

    ii. **DOUBLE-SIDED** Question Booklet.

1. a. Differentiate between online transactional processing (OLTP) and online analytical processing (OLAP)

[4 marks]

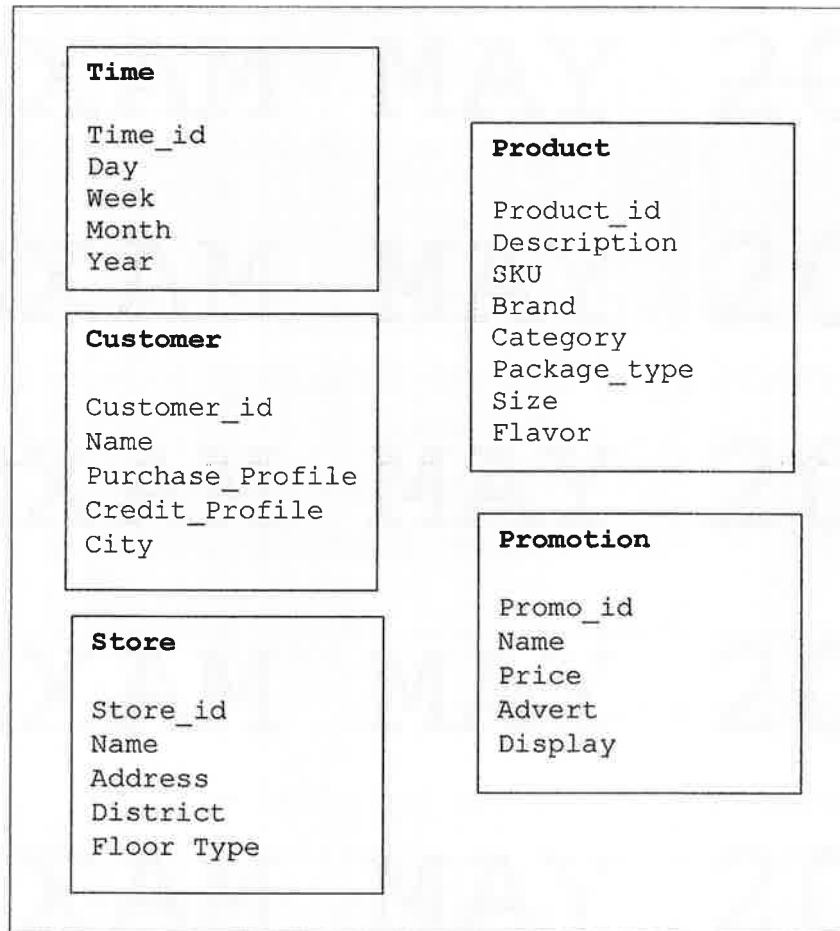b. **FIGURE Q1** shows the tables and its respective attributes for PapaJohn Marketing.com.

Time

Time_id
Day
Week
Month
Year

Product

Product_id
Description
SKU
Brand
Category
Package_type
Size
Flavor

Customer

Customer_id
Name
Purchase_Profile
Credit_Profile
City

Promotion

Promo_id
Name
Price
Advert
Display

Store

Store_id
Name
Address
District
Floor Type

FIGURE Q1: PapaJohn Marketing.com

i. Fact table has additional attributes ringgit_sold, ringgit_cost and unit_sold. Construct a dimensional model.

[8 marks]

ii.   Construct SQL statement to show the total order of products by customers located in the city of Ipoh, Kuantan and Seremban for the months of August and November of 2014.

[4 marks]

iii.   Construct SQL statement that ranks the total order of products by customers. The ranking of the total orders should have no gaps in the sequential ranking sequence when there are ties for a ranking.

[4 marks]

2.   a.   Construct a diagram that depicts the typical architecture and main components of a data warehouse.

[6 marks]

b.   Ricky worked in the Business Intelligence group with a major motion picture studio 20 years ago. They used Microstrategy software for reporting on web site traffic, and Crystal Reports for ad hoc reports. One day a system administrator came over to our aisle, face red as could be. "Who's using my database?" he yelled. I replied that the Crystal Reports programmer was working from home that day. "That's it, I'm cutting off your group from the production database."

i.   Describe a potential drawback if OLTP system used directly in data warehouse projects.

[2 marks]

ii.   Explain how Ricky's project benefits from the characteristics of a data warehouse.

[8 marks]

iii.   Differentiate between the OLTP system that you answered in **part (b)(i)** with data warehouse in the aspects of reporting and purpose.

[4 marks]

3. a. Differentiate between the Entity Relationship (ER) model and dimensional model (DM).

    [4 marks]

    b. Describe the steps in converting an Entity Relationship (ER) model into a dimensional model (DM).

    [6 marks]

    c. Explain the role of Extraction, Transform and Load (ETL) process in a data warehouse environment.

    [6 marks]

    d. Illustrate data mart.

    [4 marks]

4. a. Mono Star is a retail store that sells electrical appliances nationwide. The management of Mono Star relies on the complaints by their customer to improve the quality of their products and services. The management wants to know the length of complaint calls made about a product and the staff who responded to the calls. The Customer Service department decided to implement a data mart that could cater to these requirements. Construct a star schema for the Customer Service data mart.

[10 marks]

b. Illustrate the concept of granularity in data warehouse design.

[4 marks]

c. Contrast low and high level granularity.

[2 marks]

d. Propose **ONE (1)** example of the following summarized data:

i. Highly

[2 marks]

ii. Lightly

[2 marks]

5.   a.   **FIGURE Q5** is a relational schema for VEHICLE database.

```
Agent { A_no, A_name, A_address, A_phone }

Salesperson { SP_A_no, SP_salary }

Dealer { D_A_no, D_commision }

Hire { SP_A_no, D_A_no, H_start_date, H_end_date,
       H_module_no, H_comm._rate }

Vehicle {V_chassis_no, V_build_date, VT_type_code }

Vehicle_Type { VT_type_code, VT_make, VT_model }

Sell { SP_A_no, V_chassis_no, S_date, S_price }

Buy { D_A_no, V_chassis_no, B_date, B_price,
      B_milage }
```

FIGURE Q5: VEHICLE Database

a.   Construct an Enhanced Entity-Relationship Diagram (EERD) for **FIGURE Q5**.

[12 marks]

b.   Based on **FIGURE Q5**, construct SQL statements to create `Agent`, `Salesperson`, `Dealer` and `Hire` tables, and show all constraints.

[8 marks]

-END OF PAPER-