(DKT 223)

UNIVERSITI MALAYSIA PERLIS

Peperiksaan Semester Kedua
Sidang Akademik 2018/2019

March 2019

DKT 223 – Database System
[Sistem Pengkalan Data]

Masa : 3 jam

Please make sure that this question paper has **TWELVE (12)** printed pages including this front page before you start the examination.
[Sila pastikan kertas soalan ini mengandungi DUA BELAS (12) muka surat yang bercetak termasuk muka hadapan sebelum anda memulakan peperiksaan ini.]

This question paper has **TWO (2)** sections:
[Kertas soalan ini mengandungi DUA (2) bahagian]

Part A : This section has **FOUR (4)** questions. Answer **ALL** questions. (80 Marks)
[Bahagian A: Bahagian ini mengandungi EMPAT (4) soalan. Jawab SEMUA soalan. (80 Markah)]

Part B : This section has **TWO (2)** questions. Answer **ONE (1)** question only.
(20 Marks)
*[Bahagian B: Bahagian ini mengandungi DUA (2) soalan. Jawab SATU (1) soalan sahaja.
(20 Markah)]*

Each question contributes **TWENTY (20)** marks.
[Setiap soalan menyumbang DUA PULUH (20) markah.]

PART A
[BAHAGIAN A]

Answer all Questions
[Jawab semua soalan.]

Question 1
[Soalan 1]

(a)   Describe all these terms:
        [Terangkan semua terma berikut:]

    i)   database
        [pangkalan data]

(2 Marks/*Markah*)

    ii)   data   Known facts that are related
        [data]

(2 Marks/*Markah*)

    iii)   mini-world
        [dunia-mini]

(2 Marks/*Markah*)

    iv)   Database Management System (DBMS)
        [Sistem Pengurusan Pangkalan Data (DBMS)]

(2 Marks/*Markah*)

    v)   database system
        [sistem pangkalan data]

(2 Marks/*Markah*)

(b)   Database users may be divided to two different groups. Please explain those groups.
        [Pengguna pangkalan data boleh dibahagikan kepada dua kumpulan yang berbeza. Sila jelaskan kumpulan tersebut.]

Actors on the scene — those who create & manage the database
Workers behind the
Actors off the scene

Software managers

(4 Marks/*Markah*)

(c)   Nowadays, database approach is very important for us. Please list and explain the advantages of using the database approach.
        [Pada masa kini, pendekatan pangkalan data sangat penting bagi kita. Sila senaraikan dan terangkan kelebihan menggunakan pendekatan pangkalan data.]

(6 Marks/*Markah*)

- Data abstraction
- Self describing
- Insulation
- Allows multiple views

....3/-

Implementation - Falls in between.
Conceptual - close to how users perceive data
Physical - how computers store data

Question 2
[Soalan 2]

(a) Data Models are divided to 3 categories. Please explain all the categories.
[Model Data dibahagikan kepada 3 kategori. Sila jelaskan semua kategori.]

Physical

Conceptual

(6 Marks/*Markah*)

(b) Below is the relational schema for booking classroom in one of university:
[Di bawah adalah skema hubungan untuk tempahan bilik kuliah di salah satu universiti:]

COURSE (CourseCode, CourseTitle)
CLASSROOM (ClassID, CourseCode, LecturerID, Date)
LECTURER (LecturerID, Name, PhoneNo)
DEPARTMENT (ClassID, LecturerID, Date)

(i) Identify the Primary Key for COURSE, CLASSROOM and LECTURER.
[Kenal pasti Kunci Primer untuk COURSE, CLASSROOM dan LECTURER.]

(3 Marks /*Markah*)

(ii) Specify the foreign keys for this schema, stating any assumptions you make.
[Nyatakan Kunci Luar untuk skema ini, nyatakan andaian yang dibuat.]

(6 Marks /*Markah*)

(c) DBMS languages consist of DDL and DML. Please explain in details those languages.
[Bahasa DBMS terdiri daripada DDL dan DML. Sila terangkan secara terperinci bahasa-bahasa tersebut.]

(5 Marks/*Markah*)

DDL	DML
- ALTER, CREATE, DROP	- Changes the data in database
- Internal, External, Conceptual Schema	- Schema/database object is not changed
	- Modifies the data

....4/-

Question 3
[Soalan 3]

a) A query in SQL can consist of up to 6 clauses. The clauses are specified in the following order:

["Query" dalam SQL boleh terdiri sehingga 6 klausa. Klausa-klausa tersebut dinyatakan dalam susunan berikut:]

> SELECT   <attribute list>
> FROM   <table list>
> [WHERE   <condition>]
> [GROUP BY <grouping attribute(s)>]
> [HAVING   <group condition>]
> [ORDER BY <attribute list>]

Explain any TWO (2) clauses and give ONE (1) example of each of them to support the explanation.

[Jelaskan mana-mana DUA (2) klausa dan berikan SATU (1) contoh setiap satu untuk menyokong penjelasan.]

(4 Marks/Markah)

b) Given the following relations and anwer all questions.construct a Structured Query Language (SQL) statement to answer the following queries.

[Berdasarkan hubungan berikut dan jawab semua soalan.] bina pernyataan "Structured Query Language " (SQL)untuk menjawab "queries" berikut.]

Table 3(a)
[Jadual 3(a)]

HouseOwner

HouseNum	LastName	FirstName
121	Murugan	Kumar
255	Kamal	Nurul
379	Aziz	Ahmad
565	Tan	Meng

Table 3(b)
[Jadual 3(b)]

HouseModel

HouseNum	HouseType	Price
121	Terrace	RM 140000
255	Semi D	RM 210000
379	Bungalow	RM 350000
565	Apartment	RM 190000

Table 3 (c)
[Jadual 3 (c)]

HouseInfo

HouseCode	HouseType	Area
1	Terrace	1100
2	Semi D	1800
3	Bungalow	4000
5	Apartment	1000

Construct a Structured Query Language (SQL) statement to answer the following queries.
[Bina pernyataan "Structured Query Language " (SQL)untuk menjawab "queries" berikut.]

i) Write the syntax to create the table of HouseModel. HouseOwner & HouseModel
[Tuliskan "syntax" untuk menbina jadual HouseOwner dan HouseModel.]

(4 Marks/*Markah*)

ii) Write the syntax to insert the data for HouseOwner and HouseInfo.
[Tuliskan "syntax" untuk memasukkan data HouseOwner dan HouseInfo.]

(3 Marks/*Markah*)

iii) Show the name of the owner of Semi D house by using IN operator.
[Tunjukkan nama pemilik rumah Semi D dengan menggunakan operator IN.]

(3 Marks/*Markah*)

SELECT HouseOwner. FirstName WHEREAS
HouseOwner Inner Join HouseModel ON
HouseModel. HouseNum = HouseOwner. HouseNum WHERE 6/-
HouseModel. HouseType IN 'Semi D';

iv) Show the names those who stay in Bungalow and Semi D by using attribute Area.
[*Tunjukkan nama mereka yang tinggal di Bunglow dan Semi D dengan menggunakan "attribute" Area*]

(3 Marks/*Markah*)

v) Create a view for "Information" that includes LastName, Area and Price.
[*Bina paparan untuk "Information" yang mengandungi LastName, Area dan Price*]

(3 Marks/*Markah*)

Question 4
[Soalan 4]

(a)   An invoice for My Pet Station is shown in **Figure 1**.
       [Inbols dari My Pet Station ditujukkan ddalam Rajah 1]

INVOiceID, Dato, Cust Name, Cust Address, Pet, Procedure, Amount, Total, Tax, TotalAmt

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INVOICE

My Pet Station   DATE: JAN 13/2018
INVOICE # 987

MR. RAZIF
123, THIS STREET,
MY CITY, KANGAR
01000, PERLIS

PET	PROCEDURE	AMOUNT
RABBIT	RABIES VACCINATION	RM 30.00
CAT	RABIES VACCINATION	RM 24.00
GUINEA PIG	MINOR OPERATION	RM 80.00
	TOTAL	RM 134.00
	TAX (8%)	RM 4.32
	TOTAL AMOUNT	**RM 138.32**

Figure 1
[Rajah 1]

(i)   Normalize the data shown in given in **Figure 1** to Unnormalise Form (UNF).
       [Normalkan data yang yang diberikan dalam Rajah 1 dalam bentuk "Unnormalise Form (UNF)".]

(1 Mark/*Markah*)

(ii)   Based on **Question 4(a)(i)**, normalize the data into First Normal Form (1NF).
       [Berdasarkan pada Soalan 4(a)(i), normalkan data ke "First Normal Form (1NF)".]

(2 Marks/*Markah*)

Treatment (Pet, Procedure)
Expenditure (Amt, Total, Tax, Total Amt)

....8/-

(iii)   Based on **Question 4(a)(ii)**, normalize the data into Second Normal Form (2NF).
         [Berdasarkan pada Soalan 4(a)(ii), normalkan data ke "Second Normal Form (2NF)".]

                                                                    (4 Marks/*Markah*)

(iv)   Based on **Question 4(a)(iii)**, normalize the data into Third Normal Form (3NF).
         [Berdasarkan pada Soalan 4(a)(iii), normalkan data ke "Third Normal Form (3NF)".]

                                                                    (4 Marks/*Markah*)

(b)   Create a relationship schema from the Entity Relationship in **Figure 2**.
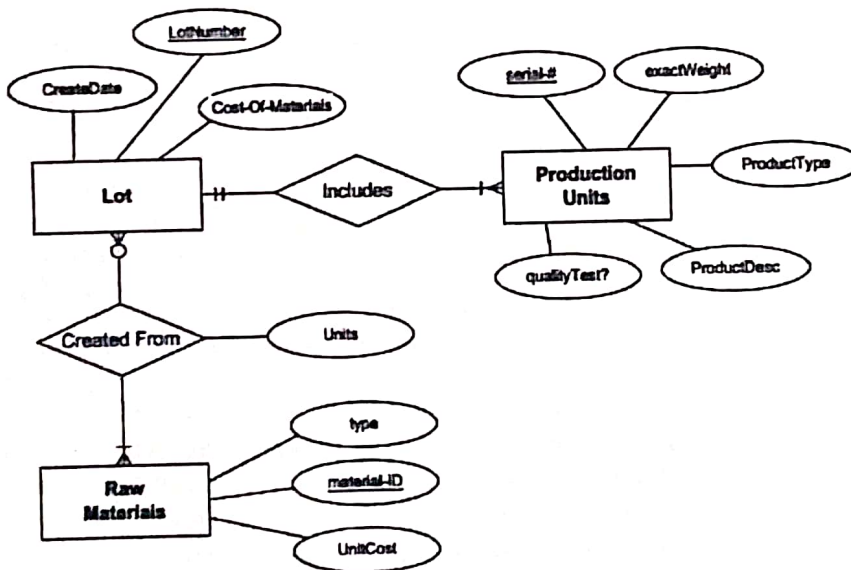   *[Bina skema hubungan daripada gambarajah hubungan entiti dalam Rajah 2.]*

Figure 2

[Rajah 2]

                                                                    (8 Marks /*Markah*)

PART B

[BAHAGIAN B]

Answer any ONE (1) question.
[Jawab mana-mana SATU (1) soalan]

Question 5
[Soalan 5]

Suppose these are the following requirements for a university database that is used to keep track of students transcripts:

[Andaikan ini adalah syarat-syarat berikut untuk pangkalan data universiti yang digunakan untuk mengesan transkrip pelajar:]

- The university keeps track of each student's name (SNAME), student number (SNUM), social security number (SSN), current address (SCADDR) and phone (SCPHONE), permanent address (SPADDR) and phone (SPPHONE), birthdate (BDATE), sex (SEX), class (CLASS) (freshman, sophomore, ..., graduate), major department (MAJORDEPTCODE), minor department (MINORDEPTCODE) (if any), and degree program (PROG) (B.A., B.S., ..., Ph.D.). Both ssn and student number have unique values for each student.

  [Universiti itu menyimpan setiap nama pelajar (SNAME), nombor pelajar (SNUM), nombor keselamatan sosial (SSN), alamat semasa (SCADDR) dan telefon (SCPHONE), alamat tetap (SPADDR) dan telefon (SPPHONE), tarikh lahir (BDATE), jantina (SEX), kelas (CLASS) (pelajar baru, mahasiswa, ..., siswazah), jabatan utama (MAJORDEPTCODE), jabatan minor (MINORDEPTCODE) (jika ada), dan program ijazah (PROG) (BA, BS, ..., PhD). Kedua-dua ssn dan nombor pelajar mempunyai nilai-nilai yang unik bagi setiap pelajar.]

- Each department is described by a name (DEPTNAME), department code (DEPTCODE), office phone (DEPTPHONE) and college (DEPTCOLLEGE). Both name and code have unique values for each department.

  [Setiap jabatan digambarkan oleh nama (DEPTNAME), kod jabatan (DEPTCODE), telefon pejabat (DEPT TELEFON) dan kolej (DEPTCOLLEGE). Kedua-dua nama dan kod mempunyai nilai-nilai yang unik bagi setiap jabatan.]

- Each course has a course name (CNAME), description (CDESC), course code (CCODE), number of semester hours (CREDIT), level (LEVEL), and offering department (CDEPT). The value of code number is unique for each course.

  [Setiap kursus mempunyai nama kursus (CNAME), penerangan (CDESC), kod kursus (CCODE), bilangan jam semester (KREDIT), peringkat (LEVEL), dan Jabatan yang menawarkan (CDEPT). Nilai kod kursus unik untuk setiap kursus.]

10/

- Each section has an instructor (INSTUCTORNAME), semester (SEMESTER), year (YEAR), course (SECCOURSE), and section number (SECNUM). Section numbers distinguish different sections of the same course that are taught during the same semester/year; its values are 1, 2, 3, ...; up to the number of sections taught during each semester.

  [Setiap bahagian mempunyai seorang pengajar (INSTRUCTORNAME), semester (SEMESTER), tahun (YEAR), kursus (SECCOURSE), dan nombor seksyen (SECNUM). Nombor seksyen membezakan seksyen yang berbeza dari kursus yang sama yang diajar semasa semester / tahun yang sama; nilai-nilai adalah 1, 2, 3, ...; sehingga bilangan bahagian diajar pada setiap semester.]

- A grade record refers to a student (SSN), refers to a particular section, and grade (GRADE).

  [Rekod gred merujuk kepada (SSN) pelajar, merujuk kepada bahagian tertentu, dan gred (GRADE).]

(a) The ER model is a conceptual data model that views the real world as entities and relationships.

[Model ER adalah model data konsep yang melihat dunia sebenar sebagai entiti dan hubungan.]

    (i) Construct the Entities diagram based on the requirements given.

      [Bina rajah Entiti-entiti berdasarkan ketetapan-ketetapan yang diberikan.]

      (4 Marks/*Markah*)

    (ii) Compose the attributes in **Question 5(a)(i)**.

      *[Bina atribut-atribut dalam **Soalan 5(a)(i)**.]*

      (4 Marks/*Markah*)

(b) Develop the Entity-Relationship diagram for this database application based on entities and attributes in **Question 5(a)**.

*[Bina rajah Hubungan-Entiti untuk aplikasi pangkalan data ini berdasarkan entiti-entiti dan atribut-atribut dalam **Soalan 5(a)**.]*

    (6 Marks/*Markah*)

(c) Write a SQL DDL statement for **THREE (3)** entities created in **Question 5(b)**.

*[Tulis pernyataan SQL DDL untuk **TIGA (3)** entiti yang dibina dalam **Soalan 5(b)**.]*

    (6 Marks/*Markah*)

Question 6
[Soalan 6]

Suppose the following requirements for a manufacturer company database that is used to keep tracks of their important data:
[Andaikan berikut ini dalah keperluan untuk pangkalan data syarikat pembuatan yang digunakan untuk menyimpan data yang penting bagi mereka:]

- A manufacturer company have a name which may assume as unique, an address, a phone number and email.
  [Sebuah syarikat pembuatan empunyai nama iaitu dianggap sebagai unik, alamat, nombor telefon dan email.]

- The manufacturer company also ddivided into several factory departments and they keep record of each factory department by their department id, department name, plan location and total number of workers.
  [Syarikat pembuatan tersebut juga dibahagikan kepada beberapa jabatan dan mereka turut menyimpan rekod setiap jabatan berkenaan melalui id jabatan, nama jabatan, lokasi plan dan jumlah pekerja.]

- There are numbers of staff working in the manufacturers company which is attached to different department. The company keep track of their staff name, staff id, address and phone number.
  [Terdapat sejumlah pekerja yang bekerja di syarikat pembuatan tersebut iaitu diletakkan di bawah jabatan yang berlainan. Syarikat tersebut menyimpan nama pekerja, id pekerja, alamat dan nombor telefon.]

- Products have a model number and a type (e.g., television, air conditioner). Each product is made by one department and different department may have different producs with the same model number. Howver, assume that no department would have two products with the same model number.
  [Produk mempun yai nombor model dan jenis (contoh: televisyen, penghawa dingin). Setiap produk yang dihasilkan oleh satu jabatan dan jabatan yang berlainan mungkin mempunyai produk yang berlainan tetapi dengan nombor model yang sama. Walaubagaimanapun, anggap tiada jabatan yang akan menghasilkan dua produk dengan nombor model yang sama.]

- Customers are identified by their unique security number. They have email address, physical address and phone number. Several customers may live at the sam physical address but assume that no customers have the same email address.
  [Pelanggan dikenalpasti melalui nombor keselamatan sosial. Mereka mempunyai alamat emel, alamat rumah dan nombor telefon. Beberapa pelanggan mungkin tinggal di alamt yang sama tetapi anggap tiada pelanggan mempunyai alamat emel yang sama.]

- An invoice will be produce when a customer places an order. An invoices has an unique invoice number and a date. An order is placed by one customer. For each order, there are one or more products ordered and there is a quantity for each product on the order.
[*Invois akan dihasilkan apabila pelanggan membuat pesanan. Invois mempunyai nombor invois yang unik serta tarikh. Pesanan dilakukan oleh seorang pelanggan. Bagi setiap pesanan terdapat satu atau lebih produk yang dipesan dan terdapat kuantiti untuk setiap produk yang dipesan]*

(a)   The ER model is a conceptual data model that views the real world as entities and relationships.
[*Model ER adalah model data konsep yang melihat dunia sebenar sebagai entiti dan hubungan.]*

   (i)   Construct the Entities diagram based on the requirements given.
   [*Bina rajah Entiti-entiti berdasarkan ketetapan-ketetapan yang diberikan.]*

(4 Marks/*Markah*)

   (ii)   Compose the attributes in **Question 6(a)(i)**.
   [*Bina atribut-atribut dalam Soalan 6(a)(i).]*

(4 Marks/*Markah*)

(b)   Develop the Entity-Relationship diagram for this database application based on entities and attributes in **Question 6(a)**.
[*Bina rajah Hubungan-Entiti untuk aplikasi pangkalan data ini berdasarkan entiti-entiti dan atribut-atribut dalam Soalan 6(a).]*

(6 Marks/*Markah*)

(c)   Write a SQL DDL statement for **THREE (3)** entities created in **Question 6(b)**.
[*Tulis pernyataan SQL DDL untuk TIGA (3) entiti yang dibina dalam Soalan 6(b).]*

CREATE

(6 Marks/*Markah*)

-oooOooo-