UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017

TERBUKA

COURSE NAME	:	DATABASE SYSTEMS
COURSE CODE	:	BIT 20803
PROGRAMME CODE	:	BIT
EXAMINATION DATE	:	JUNE 2017
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1   (a)   State **FIVE (5)** properties of a database relation.

(5 marks)

(b)   Identify **FIVE (5)** attributes for `Employee` relation.

(5 marks)

Q2   (a)   Name **FIVE (5)** computer-based security controls for a multi-user environment.

(5 marks)

(b)   Describe the security measures provided by Oracle Database Management System (DBMS).

(5 marks)

Q3   (a)   Describe the difference between the `WHERE` and `HAVING` clauses in SQL.

(5 marks)

(b)   Construct SQL command for **Q3(b)(i) – Q3(b)(iv)** based on schema table in **Figure Q3(b)**.

> The following tables form part of a database held in a relational DBMS:-
>
> ```
> Hotel (hotelNo, hotelName, city)
> Room (roomNo, hotelNo, type, price)
> Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
> Guest (guestNo, guestName, guestAddress)
> ```

Figure Q3(b)

(i)   List all double rooms (D) or family rooms (F) with a price below RM100 per night, in ascending order of price.

(3 marks)

(ii)   Calculate the total revenue per night from all double (D) rooms.

(3 marks)

(iii)   List the price and type of all rooms.

(4 marks)

(iv)   Determine total of different guests that have made bookings for August.

(5 marks)

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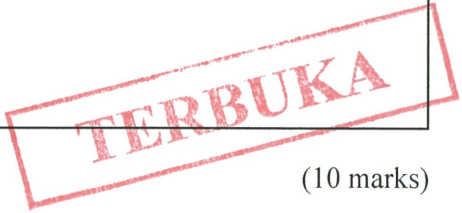**Q4** (a) Based on **Figure Q4(a)**, draw the Entity Relationship Diagram (ERD) and specify the keys.

```
Supplier(sname, itemname, price)
- Supplier sname sells itemname at price

Order(cname, sname, itemname, qty)
- Customer cname has ordered qty of item itemname from supplier sname

Customer(cname, address)
- Customer cname lives at address

Item(itemname, description)
- Info about items
```

Figure Q4(a)

(10 marks)

(b) Based on **Figure Q4(b),** draw an Entity Relationship Diagram (ERD). State any assumptions that must not contradict the requirements.

```
A database needs to be developed for a letting agency in Kota Bharu.
The agency rents out properties to tenants on the behalf of landlords.

•   The company employs staff. Every member of staff has a unique staff
    ID.  In addition they have a name, a position (like secretary,
    accountant, etc.), and a monthly salary.

•   In order to locate properties, the agency has split Kota Bharu into
    different areas.  Each area has a name, by which it can be uniquely
    identified. For each area, there is a member of staff who is
    responsible for the properties in the area.

•   For each property that the agency manages there is a property ID
    by which it can be identified. Moreover, the agency wants to record
    the address, the type of the property (like flat, house, land,
    etc.), the monthly rate, and the deposit that has to be paid by a
    tenant. Each property is located in some area.

•   Each property is owned by a single landlord. A landlord, however,
    may own more than one property. A landlord is registered with name,
    address, and phone number. Each landlord can be uniquely identified
    by their name and phone number.

•   A tenant is registered with a tenant ID, a current address, and a
    phone number.

•   A tenant rents a property by signing a lease. The lease specifies
    the start date, i.e., the time when the contract begins, and the
    duration of the lease. A lease is always related to a specific
    property. For a given property, there cannot be two leases with
    the same start date.
```

Figure Q4(b)

(10 marks)

Q5   (a)   Examine the Patient Medication Form for the Tanjung Hospital case study shown in **Figure Q5(a)**.

Patient Number: P10034							
Full Name: Robert MacDonald				Ward Number: Ward 11			
Bed Number: 84				Ward Name: Orthopaedic			

Drug Number	Name	Description	Dosage	Method of Admin	Units per Day	Start Date	Finish Date
10223	Morphine	Pain Killer	10mg/ml	Oral	50	24/03/01	24/04/02
10334	Tetracyclene	Antibiotic	0.5mg/ml	IV	10	24/03/01	17/04/01
10223	Morphine	Pain Killer	10mg/ml	Oral	10	25/04/02	02/05/03

Figure Q5(a)

(i)   Identify the functional dependencies represented by the data shown in **Figure Q5(a)**.

(3 marks)

(ii)   Describe and illustrate the process of normalizing (by using dependency diagram) the data shown in **Figure Q5(a)** to
- First Normal Form (1NF),
- Second Normal Form (2NF),
- Third Normal Form (3NF).

(10 marks)

(iii)   Based on answers in **Q5(a)(ii)**, is an instance of constructed 3NF in Boyce-Codd Normal Form (BCNF)? Justify your answer.

(2 marks)

(b)   Discuss how the technique of normalization can be used to check the structure of the tables created from the Entity Relationship model and supporting documentation.

(5 marks)

Q6   (a)   Draw Entity Relationship Diagram (ERD) for each of the information in **Q6(a)(i)** – **Q6(a)(iii)**.

   (i)   The University might need to record which teachers taught which subjects in which courses.

(3 marks)

   (ii)   At the University, each Teacher can teach an unspecified maximum number of subjects as long as his/her weekly hours do not exceed 24 hours. Teachers may teach 0 subjects if they are involved in non-teaching projects.

(4 marks)

   (iii)   Consider a university database for the scheduling of classrooms for final exams. This database could be modeled as the single entity set exam, with attributes course-name, section-number, room-number, and time. Alternatively, one or more additional entity sets could be defined, along with relationship sets to replace some of the attributes of the exam entity set, as course with attributes name, department, and c-number. Section with attributes s-number and enrollment, and dependent as a weak entity set on course. Room with attributes r-number, capacity, and building.

(8 marks)

   (b)   Based on **Figure Q6(b)**, proposed the Initial Study phase activities of Database Life Cycle (DBLC) to build a proper database system for this company.

> The Savvy Car Service & Repair Centers are owned by the car dealer. This company provides car services and repairs. Three centers of Savvy Company provide service and repair for the entire state. Each of the three centers is independently managed and operated by a shop manager, a receptionist, and at least eight mechanics. Each center maintains a fully stocked parts inventory. Each center also maintains a manual file system in which each car's maintenance history is kept: repairs made, parts used, costs, service dates, owner, and so on. Files are also kept to track inventory, purchasing, billing, employees' hours, and payroll.

Figure Q6(b)

(5 marks)

-END OF QUESTION-