



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER II SESI 2011/2012

COURSE NAME : DATABASE SYSTEM
COURSE CODE : BIT 2083 / BIT 20803
PROGRAMME : BACHELOR OF INFORMATION TECHNOLOGY
EXAMINATION DATE : JUNE 2012
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS.

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

Instruction: Answer **ALL** questions.

- Q1** (a) Define each of the following terms:
- (i) Data anomalies
 - (ii) Entity
 - (iii) Composite identifier
 - (iv) Transitive dependency
- (4 marks)
- (b) Explain the meaning of recursive in entity relationship.
- (2 marks)
- (c) Explain **TWO(2)** types of databases.
- (4 marks)
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- Q2** (a) Discuss **THREE (3)** differences between Network Data Model and Relational Data Model.
- (6 marks)
- (b) Explain **TWO (2)** Network Data Model concepts that are still being used.
- (4 marks)
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- Q3** (a) Illustrate fan traps problem in an ER model.
- (4 marks)
- (b) Differentiate strong and weak entity relationships with appropriate example.
- (6 marks)
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- Q4** Consider the following relation:
- ```
Order (orderID, orderDate, productID, productDesc, quantity,
 productPrice, grandTotal)
```
- (a) Explain the purpose of normalization.
- (2 marks)
- (b) Identify the candidate key.
- (2 marks)
- (c) Analyze all functional dependencies in this relation.
- (6 marks)

**Q5** Given the following data schema:

**EMPLOYEES**(employee\_id, name, email, phone\_number, hire\_date, job\_id, salary, commission\_pct, manager\_id, department\_id)

**DEPARTMENTS** (department\_id, department\_name, manager\_id)

**JOBS** (job\_id, job\_title, min\_salary, max\_salary)

Construct the appropriate SQL statement for each of the following questions:

- (a) Create a query to display all unique job IDs from the EMPLOYEES table. (2 marks)
- (b) Display the employee number, name, salary, and salary increased by 15.5% (expressed as a whole number) as New Salary for each employee. (3 marks)
- (c) Display the name, job title, salary and commission for all employees whose jobs are either those of a programmer or database administrator, and whose salaries are not equal to RM 2,500, RM 3,500, or RM 7,000 and whose commission is 20%. (5 marks)
- (d) Display the manager number and the salary of the lowest-paid employee for that manager. Exclude anyone whose manager is not known. Exclude any groups where the minimum salary is RM 6,000 or less. Sort the output in descending order of salary. (10 marks)

**Q6** Given the following form:

| Order Form        |                      |          |            |
|-------------------|----------------------|----------|------------|
| Order number:     | 1234                 | Date:    | 11/04/98   |
| Customer number:  | 9876                 |          |            |
| Customer name:    | Billy                |          |            |
| Customer address: | 456 HighTower Street |          |            |
| City-Country:     | Hong Kong, China     |          |            |
| ProductNo         | Description          | Quantity | Unit Price |
| A123              | Pencil               | 100      | \$3.00     |
| B234              | Eraser               | 200      | \$1.50     |
| C345              | Sharpener            | 5        | \$8.00     |

**Figure Q6**

Normalize the given form to 1NF, 2NF and 3NF with appropriate steps.

(20 marks)

**Q7** Given the following case study:

The company has 30 instructors and offers five advanced technology courses, each of which are taught by a teaching team of two or more instructors. The data held on each instructor is the instructor's name, telephone number, email address and salary. Each instructor is given an instructor number which is unique throughout the company. As for the advanced technology course, the data held is the course code which is the unique throughout the company and course name, course description, course fee and course duration. Furthermore, the advanced course offers many training session which can handle up to 100 trainees per training session. The data held for training session is training session date, training place and training time. As for the trainee data, the company will record data about their name, I/C number, telephone number, email address and home address made up of street, city, state and post code. Each trainee undertakes one advanced technology course per training session. Each instructor is assigned to a maximum of two teaching teams or may be assigned to do research. The data held for teaching team is the team ID which is unique throughout the company and team expertise. The data held about research is the research ID, research title, start date, end date and budget allocation and duration.

Represent the data requirements of the IT training company as a single ER diagram by following the given steps:

- (i) Identify the main entity types of the IT training company and attributes that associated with each of the entity.
- (ii) Identify the main relationship types between the entity types described in **(Q7)(i)** and the multiplicity constraints for each of the relationship.

(20 marks)