

**THE OPEN UNIVERSITY OF SRI LANKA**  
**Faculty of Engineering Technology**  
**Department of Electrical & Computer Engineering**



**Diploma In Information Systems and Technology**

**Final Examination (2016/2017)**  
**ECI3266: Information Systems and Data Management**

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**Date: 12<sup>th</sup> November 2017 (Sunday)**

**Time: 9:30 am – 12:30 pm**

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*Answer Five questions only, each question carry equal marks.*

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Q1) Sri Lanka is in the process of developing a Smart Card (eNIC) based Radio-frequency identification (RFID) NIC card which will replace the obsolete 'laminated type' cards by storing the holders information on a chip that can be read by banks, offices etc. thereby reducing the need to have documentation of these information physically by storing in the Cloud.

- a) List data of individual citizen of Sri Lanka, which can be used in the Smart card (eNIC). Your answer should include a way of uniquely identifying a person.
- b) Briefly describe the advantages and disadvantages of converting laminated type NIC card into eNIC for citizens/ private sector and the government.
- c) Discuss the purpose for storing eNIC information in the Cloud, and justify your answer explaining advantages and/or disadvantages.
- d) Name and briefly describe key features of three Cloud databases

(20 marks)

Q2) Normalization is a process that “improves” a database design by generating relations that are in higher normal forms.

- a) Briefly explain the terms functional dependency, partial dependency and transitive dependency using simple examples.
- b) Normalize the data given in the form Order Form (Figure 1) up to 3NF.  
UNF: ORDER(order#, customer#, name, address, orderdate(product#, description, quantity, unitprice))
- c) Identify the primary keys and foreign keys in relations in 3NF.

| Customer Order Form                      |                  |          |            |
|--|------------------|----------|------------|
| Order No: 1234                           | Date: 11/04/2016 |          |            |
| Customer Number: 9876                    |                  |          |            |
| Customer Name: Billy                     |                  |          |            |
| Customer Address: 456, High Tower Street |                  |          |            |
| City- Country: Hong Kong, China          |                  |          |            |
| ProductNo                                | Description      | Quantity | Unit Price |
| A123                                     | Pen drive 32GB   | 100      | \$7.50     |
| B234                                     | Black marker     | 200      | \$1.50     |
| C345                                     | Shapner          | 5        | \$2.00     |

Figure 1: Customer order form

(20 marks)

Q3) The key importance of information is that it allows a business to make informed decisions by presenting data in a way that can be interpreted by management. Information process should form part of a wider review process within the business to gain the best outcomes.

- List five characteristics of valuable information
- Discuss the importance and role of Information Systems in businesses. Use real world examples to illustrate your answer.
- Briefly explain three different ways to authenticate a person to control the user access to Information Systems?
- Discuss the difference between Information Protection and Information Assurance?

(20 marks)

Q4) Customer Relationship Management (CRM) is an approach to managing a company's interaction with current and potential customers.

- Discuss the need of CRM systems using examples from the banking sector.
- Describe the difference between Enterprise Resource Planning (ERP) systems and CRM? How can they be integrated?

(20 marks)

Q5)

a) Fill in the blanks using the appropriate words from the following;  
( Information, Information processing, Information Technology).

- I. Arranging customers names in ascending order is an example of -----
- II. Any fact and knowledge item that can be expressed in numbers and words is called -----.
- III. Equipment and programs used to process raw data into information are called-----  
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- b) What are the main components of an Information System?
- c) Name three services of internet banking for its users.
- d) Discuss the advantages and disadvantages of Internet Banking.

(20 marks)

Q6) The Department of Electrical & Computer Engineering organizes workshops every year. It needs to keep track of a large collection of workshops associated with the event.

Initial requirements analysis brings out the following information about what needs to be recorded in a database.

- Each workshop has a name, and happens on a particular date — or dates, as some workshops last more than one day.
- There are several participants, each of which may sign up to one or more workshops.
- For each participant, it is important to record their name, email address, and the workshops which they wish to attend.
- There are a number of meeting rooms at the conference venue, each of a fixed capacity. Meetings rooms are identified by a floor and room number.
- Every workshop needs an allocated meeting room; where a workshop lasts for two days, it will use the same room on both days.

(a) Draw an entity-relationship diagram suitable for representing this information, in particular the connections between participants, workshops, rooms, and dates.

(b) For each of the following concepts give a brief description of what it means, and give an example from your ER diagram for the previous part.

- (i) Key
- (ii) Composite key
- (iii) Total participation
- (iv) Key constraint

(Note: Use Chen notation )

(20 marks)

Q7) You are requested to design an Entity Relationship (ER) model for a university database considering the following statements.

- The university contains many departments
  - Each department can offer any number of courses
  - Many lecturers can work in a department
  - A Lecturer can work only in one department
  - For each department there is a Head
  - A lecturer can be head of only one department
  - Each Lecturer can take any number of courses
  - A course can be taken by only one Lecturer
  - A student can enrol for any number of courses
  - Each course can have any number of students
- a) Identify the entities, relationships, key attributes, relevant attributes and draw a complete ER diagram for the given scenario.  
(Note: Use Chen notation )
- b) Convert the ER diagram into relational schema.

(20 marks)

Q8) The Department of Electrical and Computer Engineering, the Open University of Sri Lanka has decided to maintain student progress for each courses delivered by the department in a database for 2016/17 academic year.

Read the following requirements and you have to design and do the normalization up to 3NF.

- The department delivers many courses
- Each Lecturer can take any number of courses
- Each course will be taught by one lecturer
- A student can enrol for any number of courses
- Each course can have any number of students
- Student can get each course completed by a CA mark at the end of the academic year.

UNF: (Course code, Course name, Lecturer Id, Lecturer name, Student ID, Student name, Date of birth, Gender, email address, Course CA mark)

- a) Name entities in the 3NF and identify the primary keys and foreign keys.  
b) Write SQL statements to Create tables and add at least 5 records into each table.  
c) Write SQL query to get student details who have >60 CA marks for ECI3266 course .

(20 marks)

**TOTAL MARKS FOR THE PAPER: 100**