

THE OPEN UNIVERSITY OF SRI LANKA
 Department of Electrical & Computer Engineering
 DIPLOMA IN INFORMATION SYSTEMS AND TECHNOLOGY
 ECI3266 – Information Systems and Data Management



Final Examination - 2015/2016

(CLOSED BOOK)

Date: 20th NOVEMBER 2016

Time: 09.30 – 12.30 hrs.

Answer **FIVE** questions ONLY.

Q1.

- (i) An Enterprise Resource Planning (ERP) system is an information system that supports the main business processes of an organization.

Describe the importance of having an ERP System in an organization with a real world example. [04 marks]

- (ii) The ideal ERP system would qualify as the best model for enterprise-wide solution architecture.

Briefly describe four major organizational processes in ERP system which includes central database repository and a fused computing platform. [04 marks]

- (iii) There are many risks and treats to consider when developing information systems.

Describe how you would protect the security of the following.

- a) Data
- b) Hardware
- c) Network

[2x3=06 marks]

- (iv) Data stored in a cloud database is often seen as one way for a small businesses that can afford current technology.

Discuss the advantages and disadvantages of a small business using a cloud database.

[06 marks]

Q2.

- (i) Briefly describe three major steps of the data modeling process in database design? [06 marks]
- (ii) What is the difference between logical data independence and physical data independence? [04 marks]
- (iii) Explain what is meant by the following database terms:
 a) Relational Database Management System (RDBMS)
 b) Cloud Database [2x2=04 marks]
- (iv) Compare and contrast the advantages and disadvantages of RDBMS and Cloud Database Systems. [06 marks]

Q3.

- (i) What is referential integrity? How do you represent it in relational model? [04 marks]
- (ii) Discuss the advantages and disadvantages of ER diagram in Database design. [04 marks]
- (iii) A consultancy company handles different projects using manual payroll system which is based on project card for each project officer. The manual project card is proposed to replace with a computerized database. You have been asked to design the database. The proposed Project Card System has the following properties:
- A Project card contains project name/s, hours worked for project and date submitted
 - Each Project card is associated with exactly one employee
 - Each Project card has unique ID
 - Each Project card has a status: Approved, Not approved, or pending (not examined yet)
 - Each employee has a name, address, and unique ID
 - Each employee submits a project card every pay period (Ex. In one year they will submit multiple project cards)
 - Each employee is associated with exactly one Project Manager
 - Each Project Manager is also an employee
 - Each Project Manager is in charge of one or more employees
 - Each Project Manager approves project cards for one or more employees

Draw an ER diagram to describe this information.

[12 marks]

Q4.

A Research consultancy firm maintains details of all activities that all research staff are currently involved with. These details comprise:

Employee ID, Employee Name, Date of Join, Divisional Code, Division Name, Research Code, Research Description, Research Supervisor

Assume the following:

- Each employee ID is unique.
- Each Division has a single Divisional code.
- Each Research has a single code and Research supervisor.
- Each employee may work on one or more researches.
- Employee names need not necessarily be unique.
- Research Code, Research Description and Research Supervisor are repeating fields.

(i) Normalize this data to Third Normal Form.

[06 marks]

(ii) Use proper names to each table in the 3NF. Write SQL statements to create tables, identifying primary key/s and foreign key/s.

[06 marks]

(iii) Draw tables in the 3NF and add sample data into the tables. Write SQL statements of Insert, Update and Delete for tables.

[08 marks]

Q5.

The case study of Haritheeky

The Management of the 'Haritheeky' ayurvedic centre wants to create a database to keep track of its medics, patients, herbal medicine and herbal prescriptions. For simplicity, both a herbal medic and a patient will be recorded for his or her name, a herbal medicine will be recorded for its name, unit and the price per unit, and a prescription will be recorded for its date, the patient and medic, and all the herbs included in the prescription.

(i) Design a database in terms of an Entity Relationship (ER) diagram. This ER diagram should include explicitly the primary keys, foreign keys and relationship types. State the additional assumptions.

[08 marks]

- (ii) Map the ER diagram into the relations. Indicate all the primary keys, foreign keys, relationships, as well as at least the important attributes. [08 marks]
- (iii) Write SQL statements that generate at least two tables for your designed database in above with proper data types, primary keys and foreign keys if any. You must clearly define at least two tables, which contains a foreign key. [04 marks]

Q6.

- (i) Define the roles and responsibilities of the following systems personnel:
 a) System analyst
 b) Database administrator
 c) Network administrator [2x3= 06 marks]
- (ii) It has been identified that the Open University of Sri Lanka is finding difficulty to keep up to date with new technology for online delivery of courses. Assuming that you are the Director/IT of the Open University, write a report to the senior management discussing and providing examples of how new technology such as 'Cloud', could be used to give competitive advantage to the university. [14 marks]

Q7.

- Today extensive automation is practiced practically in every type of manufacturing and assembly process.
- (i) Describe the benefits of Automation for **Manufacturing Industry** with real world examples. [08 marks]
- (ii) An Automated Teller Machine (ATM) is an example of an interactive process used by banking systems. The ATM can perform a logic derived response to a user based on information retrieved from a networked database of the bank. Based on user selection buttons in ATM, different logical response can be given as an output. Assume that you need to perform transactions using ATM.
- Write three simple paragraphs describing basic steps to perform each transaction for the following functions using your 'Debit card'. State any assumptions.
- a) Balance inquiry
 b) Withdrawing money
 c) Printing balance slip [4x3=12 marks]