SOUTH EASTERN UNIVERSITY OF SRI LANKA

FIRST EXAMINATION IN BACHELOR OF INFORMATION AND COMMUNICATION TECHNOLOGY-2015/2016

SEMESTER – I, JULY 2016

CIS 11022 - DATABASE DESIGN

Answer All Questions **Time: 02 hour**

Question No. 01)

a. Define each of the following terms.

i. Data
ii. Database
iii. Database Management System
iv. Database Application Program

(12 Marks)

b. List down the main characteristics of the database approach and explain in brief.

(10 Marks)

c. A database approach addresses many problems and challenges associated with the traditional file-based approach. Using a DBMS to control how data is shared with different applications and user has a number of advantages. However, the implementation of a database approach has its own challenges, such as expense. Discuss the various costs associated with the implementation of a database approach.

(14 Marks)

d. Describe the role of database management systems (DBMS) in the database approach and discuss why knowledge of DBMS is important for database administrators.

(14 Marks)

[50 Marks]

Question No. 02)

a. List down five (05) advantages of traditional two-tier client-server architecture.

(10 Marks)

b. Write brief notes on three (03) types of Multi-User DBMS Architectures.

(12 Marks)

c. Explain the phrase 'three-tier architecture' with respect to databases and the ANSI-SPARC model.

(14 Marks)

d. Explain the concept of database schema and discuss three (03) types of schema in a database.

(14 Marks)

[50 Marks]

Question No. 03

a. Define the term "database integrity". How does database integrity differ from database security?

(08 Marks)

b. What is the difference between a procedural and non-procedural language? How would you classify the relational algebra and relational calculus?

(08 Marks)

c. What is a "data model"? Describe the relational data model by providing of an example.

(12 Marks)

d. Briefly explain three (03) possible benefits of "Views" in databases.

(12 Marks)

e. Describe the role and content of the system catalogue in a DBMS.

(10 Marks)

[50 Marks]

Question No. 04)

a. What is normalization? Why normalization is important?

(08 Marks)

b. A company stores employee records in the format shown below. Two such employees' records are given below.

Employee ID: E05 Name: Fred Shred Job Title: Manager		
Branch Code: B04 Branch Name: London		
Qualification	Level	Year Obtained
BSc	Undergraduate	1986
PhD	Postgraduate	1990

Employee ID: E07 Name: Jim Brown Job Title: Assistant		
Branch Code: B04 Branch Name: London		
Qualification	Level	Year Obtained
BSc	Undergraduate	1986
PhD	Postgraduate	1990

i. Identify the repeating group of attributes and transform the above unnormalised / 0NF table into 1st Normal Form.

ii. Identify any partial dependencies and transform into 2nd Normal Form / 2NF.

iii. Identify any transitive dependencies and transform into 3rd Normal Form / 3NF.

(22 Marks)

c. A university has adopted a personal identity card (PID) system to improve security and to restrict access to certain groups of people (such as students, teachers, professors, secretaries, managers etc) and at certain times and dates. A person is issued a PID card as soon as they become part of the University community (either employed or on a course of study). Each person belongs to only one group which determines what buildings they can access. To enter a building, a person (each having a unique personID) must have permission which is established when their PID card is swiped through a PID card reader outside the building they wish to enter. A PID card reader is located outside the door of a building users wish to access. Permission is granted only if their access credentials are successful. If access is allowed, the captured data is logged, recording the date, personID (from the PIDcard) and the PIDreaderID.

Produce an Entity-Relationship Diagram of the above scenario. (State, the notation used and include in ERD, cardinality ratio, key concepts, any other sample attributes and any assumptions made, which do not contradict the discourse).

(20 Marks)

[50 Marks]