THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME : LEVEL 04
CPU2241- DATABASE MANAGEMENT SYSTEMS
NO BOOK TEST II – 2016/2017

DURATION:One Hour and 30 minutes (1.5 Hours)

Date: 19.05.2017 **Time: 4.00 p.m. – 5.30 p.m.**

Answer All Questions.

QUESTION 01

Read the following scenario carefully.

One Cinema Association in Sri Lanka has decided to store their information in a database. The information is as follows,

An Actor has an ID, Name and Phone number. An Actor may hold several phone numbers. Each actor acts on at least one Movie and a Movie can have many actors. A Movie should have an ID and a title.

An Award has an ID and a title. Each Director and Theatre has an ID and a name. Each Director directs at least one Movie and a Movie is directed by only one Director. A Director selects at least one Actor and Actor may (may not) selected by a Director. An Actor may (may not) wins Awards and an Award is won by only one Actor. Once an Actor wins an Award, the won date should be stored appropriately.

A Theatre shows at least one Movie and a Movie is showed by at least one Theatre. Once a Theatre shows a Movie, the showed date should be stored appropriately.

a) Identify entities and their attributes. Draw each entity with its attributes using the ER notation (use Chen notation). When drawing, use standard naming conventions you learned.

b) Draw the complete ER diagram with proper relationships.
   - You don`t need to show all the attributes of an entity (Because you showed them in the previous question). Show only the primary key of each Entity.
   - Show the proper connectivity of the relationships.
   - Represent the relationship`s participation as optional or mandatory.
   - Use standard Chen notation to draw the ER diagram.

c) Draw the relevant Relational Schema for the ER diagram.

QUESTION 02

Look at the following dependencies.

Doctor_ID → Doctor_Name, Type
Hospital_ID → Hospital_Name, Hospital_Location
Doctor_ID, Hospital_ID → Patient_ID, Hours
Patient_ID → Hospital_ID

1. Draw the dependency diagram according to the above mentioned dependencies.

2. Answer the following questions according to the dependency diagram you have drawn in part (1).

   a) What is the Normal Form that the dependency diagram is currently in?

   b) What is "Partial Dependency"? If there are any partial dependencies in the dependency diagram, identify and mark them.

   c) What is "Transitive Dependency"? If there are any transitive dependencies in the dependency diagram, identify and mark them.

   d) Normalize the dependency diagram conform to both Third Normal Form (3NF) and the Boyce-Codd Normal Form (BCNF).

      Clearly show the steps (1NF, 2NF, 3NF and BCNF) you follow and mark the primary keys of each decomposed table.