CST203-2

UVA WELLASSA UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

END SEMESTER EXAMINATION – SEMESTER I – 2008/2009

CST203-2 DATABASE MANAGEMENT SYSTEMS

Time Allowed: **TWO HOURS** Answer **All** Questions.

1) Briefly describe the following terms associated with Database Management Systems. (4 × 5 Marks)

   a) Data Mining
   b) Extensible Markup Language (XML)
   c) Conceptual Schema
   d) Indexing

2) a) A database is being constructed to keep track of the teams and games of a Sports Club. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions of they played in that game and the result of the game.

   i) Design an ER schema diagram for this application. (15 Marks)

   ii) State all assumptions you have made. (You may choose any group sport of your choice) (5 Marks)

   iii) Identify and list all structural constraints associated with each relationship type of your design (10 Marks)

3) a) What is the difference between a key and a super key? Briefly describe by giving an example. (5 Marks)

   b) What is a foreign key? For what purpose you use this concept? (5 Marks)

   c) Consider the following six relations for an Order-processing database application in a company.

   CUSTOMER (Cust#, Customer_name, Customer_address, City, Customer_phone, Sex)

   ORDER (Order#, Order_date, Cust#, Order_total_amt)

   ORDER_ITEM (Order#, Item#, Qty)

   ITEM (Item#, Description, Unit_price)

   SHIPMENT (Order#, Warehouse#, Ship_date, Shipping_cost, Shipping_address)

   WAREHOUSE (Warehouse#, City, Telephone#)

   Assume that an order can be shipped from several warehouses. Specify the foreign keys for this relational schema. State any assumptions you make. (7 Marks)

d) Specify the following queries using the relational algebra on the above schema. (2 × 4 Marks)

i) List the Order# and Ship_date for all orders shipped from Warehouse number "W19"

ii) List the orders that were not shipped within 30 days of ordering

4) a) Briefly describe Third Normal Form (3NF). What are the conditions should a relation satisfy to be in 3NF? (5 Marks)

b) Consider the following database relation containing the attributes **Book-id, Subject-category-of-book, Name-of-author** and **Nationality-of-author** with **Book-id** as the primary key.

i) What is the highest normal form satisfied by this relation? Justify your answer (5 marks)

ii) Suppose the attributes **Book-title** and **Author-address** are added to the relation and the primary key is changed to **{Name-of-Author, Book-title}**, what will be the highest normal form satisfied by this relation? Justify your answer (5 marks)

c) Let R = {A, B, C, D, E, F} be a relation schema with the functional dependencies C → F, E → A, EC → D, A → B. Which of the following is a key of R? Justify your answer. (10 Marks)

i) CD ii) EC iii) AE iv) AC