THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY
(DICT 10M/DICT 2K 10J)
YR II SEM II

EIT 3203: DATABASE MANAGEMENT SYSTEMS

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:
This paper consist of **TWO** sections **A** and **B**
Answer questions **ONE (COMPULSORY)** and any other **TWO** questions from the list of questions below
SMP tables and Calculators can be used
This paper consists of **THREE** printed pages

SECTION A (30 MARKS) – Answer all Questions in this section

Question 1 (Compulsory)

a) Explain 'database application' (2 marks)

b) List **SIX** major steps you would take in setting up a database for a particular enterprise (3 marks)

c) (i) Discuss advantages of centralized and distributed databases (2 marks)

(ii) Explain how the following differ: fragmentation transparency, replication transparency, and location transparency (6 marks)

d) A university registrar's office maintains data about the following entities: (a) courses, including number, title credits, syllabus and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings and classroom; (c) students, including student-id, name and program, and (d) instructors, including identification number, name, department and title.
Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.
Construct an E-R diagram for the registrar's office. Documents all assumption sthat you ake about the mapping constraints (10 marks)

e) Explain how data redundancy is controlled in DBMS as compared to file-based systems (4 marks)

f) Explain with examples, how primary key and foreign key concepts is useful in relation to data model (3 marks)

SECTION B – Answer any TWO questions

Question 2

a) Explain the differences between the terms: CANDIDATE KEY, PRIMARY KEY, FOREIGN KEY and ALTERNATE KEY. (4 marks)

b) How does the concept of an object in the object-oriented model differ from the concept of an entity in the entity-relationship model? (4 marks)

c) Suppose that you have been hired as a consultant to choose a database system for your client's application. For each of the following applications, state the type of database model you would recommend. Justify your recommendation
(i) A simple user access program
(ii) A system to track contributions made to candidates for public office
(iii) An information system to support the making of movies (6 marks)

d) Explain the notions of transperancy and autonomy. In distributed systems (4 marks)

e) Write the SQL statement for the following description ***"Update the employee fname to Jim instead of James for employee 118"*** (2 marks)

Question 3

a) Use an example to illustrate the lost update problem in transaction processing (4 marks)
b) With the aid of a diagram, explain the DBMS transaction subsystem (10 marks)

c) Explain how the two main concurrency control techniques allow transaction to execute safely in parallel subject to certain constraints (6 marks)

Question 4

a) Explain the difference between a weak and a strong entity set (2 marks)

b) A database is being constructed to keep track of the teams of a basketball league. Each team is identified by its name and its described by its players and the head coach. Each game is ideitfied by its number and is described by the location and the time. We assume that for each game, the two participating teams are specified as a home team and a foreign team. With respect to each game, both the home team and foreign team, keep the records of their total scores, the number of rebounds and the member of steals.

i) Draw an ER diagram to represent your schema for the database (8 marks)

ii) Derive a relational database schema for your ER-Diagram (6 marks)

c) Explain the difference between logical data independence and physical data independence (4 marks)

Question 5

a) Briefly explain the concept data warehousing (4 marks)

b) (i) Differentiate between the Client-Server design databases and Distributed databases (4 marks)

(ii) Explain **FOUR** advantages of distributed in databases (8 marks)

c) Consistency and Isolation aspects of transaction are due to the ACIDITY properties of transaction. Discuss each of these properties (4 marks)