TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE/TECHNOLOGY IN INFORMATION TECHOLOGY
(BSIT/BTIT 12S/13S)

ICS 2206/EIT 4205: DATABASE SYSTEM

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2013
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions.
Attempt question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Define the term "Relation" in the context of the Relational Model of dat. **(3 marks)**

b) Describe the function of each of the following:
   (i) Views
   (ii) Stored procedures **(6 marks)**

c) Using appropriate examples, explain the difference between:
   (i) Strong and weak entity types
   (ii) Binary and Tenary Relationship **(8 marks)**

d) Explain what normalization is and why one needs to do normalization in DBMS **(5 marks)**

e) What is database modeling? Briefly describe it's relevance in developing a database system **(5 marks)**

f) Explain entity types and key attributes in a data model. **(3 marks)**

Question Two

a) The results of a multiple choice quiz are recorded in the format shown below.

Candidate ID: C103	Name: BILLY Smart	Address: 17 Union Street	
Question NO.	Question Text	Correct Answer	Candidate Answer
Q1	What is the capital of frame	C	C
Q2	Who wrote Moby Dick?	B	A

All candidates sit exactly the same test. The questions are always presented in the same order as are the answer of each question. The candidate must choose between FOUR answers, labeled A-D, for each question. Only one label represents the correct answer. In the above table, the candidate answered question Q1 correctly and question Q2 incorrectly.

(i) Identify the repeating group of attributes and transform the above un-normalized table into tables that are in First Normal Form **(5 marks)**

(ii) Identify any transitive dependencies and transform into tables that are in Third Normal Form. **(5 marks)**

(iii) Identify any transitive dependencies and transform into tables that are in Third Normal Form. **(5 marks)**

b) Describe the main characteristics of the database approach and contrast it with the file-based approach. **(5 marks)**

Question Three

Read through the following discourse then answer the questions that follow:

A company transports many chemical PRODUCTS from one location to another on behalf of a registered CUSTOMER. Each transport operation is called a JOB, which involves picking up one or more LOADS of the same product from a customer requested start location and delivers it to a customer's requested destination. A unique number is given for each JOB and for each LOAD when they are created. A load is transported using a particular TRANSPORT UNIT, which consists of a lorry, a driver a container (for carrying the product) and occasionally specialist loading equipment (Such as Jacks and pumps). A container is fixed to a trailer so it needs to be coupled to a lorry at the start of a job. Transport operations are run from 5 regional DEPOTS. Jobs are allocated to individual depots to service. Depots are usually located near to pick up points such as chemical plants. Depots hold, manage and maintain their own transport units which are permanently allocated to them to service jobs. A container and sometimes associated loading equipment, may on occasions be left at destinations or pick-ups after a job is finished. But normally transport units are held at the base Depot they belong.

a) Identify all the entities from the discourse above. **(5 marks)**

b) Identify all relationship from the discourse above. **(5 marks)**

c) Produce an entity relationship model using the Entity Types identified above in bold font. State any assumptions you make clearly and precisely and not contradict the discourse. **(10 marks)**

Question Four

a) Using a suitable diagram and any appropriate examples describe the ANSI 3-Level database architecture and how a database form relates to that model. Explain at what level would a form sit within the three-level architecture of a typical database system. **(10 marks)**

b) Explain with an example, the concept of SQL injection show one techniques that can be used to prevent SQL injection being carried out. **(6 marks)**

c) Database user has been using the password "BLUE" for his database account for the past two years. Give reasons why this is a security risk and suggest ways in which his password management could be improved. **(4 marks)**

Question Five

a) The traditional database approach is centred on the relational model of data and has been for over 30 years. Discuss why the relational model has endured despite the rise of object oriented techniques over the last 30 years. **(10 marks)**

b) Explain with aid of examples what is meant by logical and physical data independence in a database system. **(10 marks)**