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University Examinations 2013/2014

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTERE SCIENCE AND BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENC E

ICS 2206: DATABASE SYSTEMS

DATE: DECEMBER 2013

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

- Use table 1 and table 2 to answer questions two, three and four

Table 1

Client no.	f_Name	L_Name	physical address	gender	contact
cl02	John	Kingori	nyeri	M	07xxxx
cl37	Steve	Kipkorir	karatina	M	020yyyy
cl14	Susan	Mutual	nyeri	F	073xxxx
cl26	Steve	Kingori	muranga	M	072yyyy

Table 2

order_No	Date ordered	client	Items no	item	quantity
Or1	1/5/20xx	Cl02	It1	blankets	9
or7	4/2/20yy	Cl14	It3	Hand bag	6
Or3	6/7/20xx	Cl26	It1	blankets	8
or26	5/8/20xx	Cl14	It4	shirt	2

QUESTION ONE (30 MARKS)

a) Explain the following terms:

- Database (1 Mark)
- SQL (2 Marks)
- Relational database (2 Marks)

- b) Compare and contrast;
 - i. Primary key and foreign key. (2 Marks)
 - ii. DDL and DML (2 Marks)
- c) Why would you advice a client to use DBMS as opposed to a file based system in his/her premises. (10 Marks)
- d) i) What is meant by degree of relationship? (1 Mark)
 ii) Explain the different degrees of relationship in a relational database. (6 Marks)
- e) Differentiate between;
 - i. A relation and a relationship (1 Mark)
 - ii. Entity type and an instance of an entity (1 Mark)
 - iii. A hierarchical and a network data model (2 Marks)

QUESTION TWO (20 MARKS)

- a) The above tables are part of the database for a certain shop, find appropriate names for the database and the tables. (1 ½ Marks)
- b) Draw the appropriate E-R diagram for the database represented by these tables. (5 Marks)
- c) With explanation state the;
 - i. Cardinality of the relationship between the tables. (2 Marks)
 - ii. Participation of each of the tables. (2 Marks)
- d) In each of the tables list;
 - i. The candidates key (1 ½ Marks)
 - ii. Primary keys (1 Mark)
 - iii. Foreign keys (1 Mark)
- e) If you were to create the two tables and the relationship between them in a Microsoft access database;
 - i. Explain the data types you would chose for each of the attributes in **Table 2**. (3 Marks)
 - ii. How would you ensure that the gender field in **table 1** only accepts 'f' and 'm' values? (3 Marks)

QUESTION THREE (20 MARKS)

Write an SQL statement that would do the following in an mySQL database

- i. Create the two tables (6 Marks)
- ii. Insert the first two records into the **table 2** (4 Marks)
- iii. List down the name of the clients, the orders they have made and the dates they made those orders starting from the most recent order. (8 Marks)
- iv. Calculate the average total number of items ordered per day. (2 Marks)

QUESTION FOUR (20 MARKS)

- a) What is normalization? (2 Marks)
- b) Explain the first three normal forms. (6 Marks)
- c) Explain any two rules that are followed in normalizing a relational database. (4 Marks)
- d) Using **table 1** and **table 2**;
 - i. State the normal form for each of the tables and explain your answer. (4 Marks)
 - ii. Explain any data integrity issues that may arise if the tables were to remain in the current normal forms. (4 Marks)

QUESTION FIVE (20 MARKS)

- a) What is data model? Explain any three components of a data model. (5 Marks)
- b) Object based data models use concepts such as **entities**, **attributes** and **relationships**. Explain each of these terms as used in object based data models. (6 Marks)
- c) Explain any three disadvantages of the hierarchical data model. (6 Marks)
- d) Outline any three factors to consider while determining the best data model that suits an organization. (3 Marks)