



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE AND BACHELOR OF EDUCATION

SMA 392: DATABASE SYSTEMS

DATE: Thursday, 1st December, 2011

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS: Attempt question **ONE** and any other **TWO** questions.

QUESTION ONE

- a) Explain the advantages of database of database approach over flat file approach to data management [5 marks]
- b) Use a diagram to illustrate the architecture of a standard database system [5 marks]
- c) Give five reasons as to why Relational data model has proved to be much more successful compared to other data models [5 marks]
- d) With reference to relational data model, define the following
 - i. Domain
 - ii. Degree
 - iii. Foreign key [9 marks]
- e) Consider the following description of a library information system

Library information system keeps information about the various books and articles, their authors and publishers. It also keeps information about registered users including book copies they borrow and return.

Identify the various entities in the system and develop an Entity Relationship Model (ERM) [6 marks]

QUESTION TWO

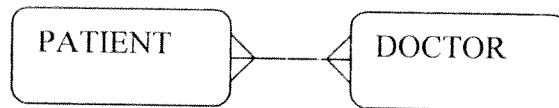
- a) Identify and give examples of the various categories of entities for a ERM [5 marks]
- b) Define cardinality and explain its significance in defining relationships among entities [3 marks]
- c) Explain the significance of **ROLE** play in the definition for a relationship

[3 marks]

d) Study the ERM below showing the relationship between a **DOCTOR** and **PATIENT**

- Explain the issues associated with the entity relationship depicted in the ERM
- Demonstrate how such a relationship may be resolved
- Use intuition to figure out the attributes of the RELATIONS in the Model

[9 marks]



QUESTION THREE

a) Define the term Normalization

[3 marks]

b) Define the following normal forms

- First Normal form
- Second Normal form
- Third Normal form

[6 marks]

c) For the relation Customer order (**Customer number, first name, second name, order no, order date, item number, item description, quantity ordered**) perform normalization to the third normal form

[6 marks]

d) Write down SQL create two related tables resulting from the normalization process in (c) above

QUESTION FOUR

Consider the following set of related tables:

STUDENT

ID	Name	Province	Program Code	YearOfBirth
10000	Mwangi F K	Central	BIT	1980
10001	Hamisi M	Coast	BAS	1979
10002	Okello G M	Nairobi	BAS	1981
10003	Mutua M K	Eastern	BIT	1981

FEES

RECEIPT NO	ID	AMOUNT
100	10000	56000
101	10001	72000
102	10002	45000
103	10003	37000
104	10002	5000
105	10003	3000
106	10000	6000
107	10001	12000

Write SQL Statements to achieve the following

- List All students in ascending order names [3 marks]
- List id and name of students born after 1980 [3 marks]
- List student details together with fee payments [3 marks]
- Show Total fees paid by all students [3marks]
- List fees paid for every program [5 marks]
- List students whose names start with "M" [3 marks]

QUESTION FIVE

- What is the role of a database administrator in a database system? [5 marks]
- Explain the features that database administrator may consider before selecting a database system [5 marks]
- Explain the meaning of the following concepts with reference to database security
 - Security
 - Integrity [6 marks]
- State four facilities that are available for database recovery [4 marks]