MACHAKOS UNIVERSITY

University Examination

SCHOOL OF ENGINEERING AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

DATABASE SYSTEMS

DATE: **TIME: 2 HOURS**

INSTRUCTIONS:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

Question 1 (30 Marks)

(a) The Teachers' Service Commission recently migrated from a file-based data storage system to a database system. State FIVE reasons that may have necessitated this migration. **(5 marks)**

(b) Mulleys supermarkets consist of a chain of supermarket stores found in the lower eastern region of our country. A database is required that will integrate and connect the operations of the various branches of Mulleys supermarkets.

(i) Explain FIVE components that will constitute the database environment for Mulleys supermarkets. **(10 marks)**

(ii) With suitable reasons, describe whether this database will be:

1. a centralized or a distributed database
2. a workgroup or an enterprise database

(4 marks)

(c) Using illustrations from Mulleys supermarkets, differentiate between a transaction processing database from a decision support database. **(6 marks)**

(d) Provide an example of a database schema that can be created from the Mulleys database system. **(5 marks)**

Question 2 (20 Marks)

(a) Describe the database development lifecycle with respect to a students' database system. **(10 marks)**

(b) (i) Explain the significance of the following database objects in the students'

database system:

1. Form
2. Query
3. Report

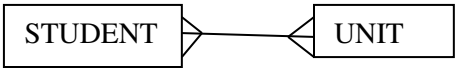
(6 marks)

(ii) Differentiate datasheet view from design view as used in Database Management Systems, and with respect to a table called STUDENT found in the students' database system. **(4 marks)**

Question 3 (20 Marks)

(a) (i) Mwatu chemist in Machakos town acquires drugs from various wholesalers in bulk. The chemist staff then unpackages these drugs and sells them to individual customers at retail prices. If the chemist were to design a database for its operations, list FIVE entities that will included in the design. **(5 marks)**

(ii) Consider the many-to-many relationship shown below:



Illustrate the steps and notations you would follow while resolving this relationship. **(6 marks)**

(b) *At Machakos university, prospective students apply for admission into the university online. Qualified applicants are then short listed and subsequently admitted into the university. Student's admission number, names, date of birth and gender are some of the details kept about a student. A student who has already been admitted into the university will then undertake a particular course, such as Engineering, Computing, Business studies, etc. Details such as the course code, course name, duration and mode (full-time or part-time) are kept. Various units are offered within the specific courses and a student takes at least five units in any given semester. The unit code, name, stage, academic year and semester are some of the details recorded about a unit. In addition, a unit can only be offered if a minimum of fifteen students register for it.*

(i) Based on the above description, draw a suitable ER-Diagram. **(6 marks)**

(ii) Differentiate between optional and mandatory associations, using examples from the diagram drawn in (i) above. **(3 marks)**

Question 4 (20 Marks)

(a) A hospital wants to normalize its database that contains patient and consultant details.

(i) Explain THREE reasons that may necessitate the normalization process. **(6 marks)**

(ii) Discuss any TWO steps this process will follow. **(4 marks)**

(b) Normalize the following table to the Third Normal Form and draw the corresponding Entity Relationship Diagram (ERD) resulting from the process. **(10 marks)**

Patient_no.	Patient_name	Consultant_no	Consultant_name	Consultation_date

P001	Pijays	C101	Caesar Nguta	05-12-2010
		C111	Jane Mbugus	08-12-2010
P100	Penta	V110	Moses Otoyo	27-12-2010
		C101	Caesar Nguta	08-12-2010

Question 5 (20 Marks)

(a) (i) State why understanding of a database architecture is important. **(2 marks)**

(ii) Explain the components of the ANSI SPARC database architecture, in relation to a students' database system. **(8 marks)**

(b) Consider a table called ***ITEM*** which has ***itemcode, itemname, datemanufactured, cost*** and ***sellprice*** as its attributes. Write SQL statements to:

(i) create the table. **(4 marks)**

(ii) remove column called ***sellprice*** from the table. **(3 marks)**

(iii) increment the ***Cost*** of all items by 15%. **(3 marks)**