



MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SECOND SEMESTER EXAMINATION FOR BACHELOR OF
SCIENCE IN MATHEMATICS

SMA 392: DATABASE SYSTEMS

DATE: 5/12/2017

TIME: 2.00-4.00 PM

INSTRUCTIONS: Answer Question **ONE** and any other **TWO** Questions

QUESTION ONE (30 MARKS)

- a) Explain:
- THREE** merits and (6 marks)
 - TWO** demerits of DBMS (4 marks)
- b) Database security is important. List at least **FOUR** services of database security. (4 marks)
- c) Using examples give **THREE** constraints used when creating database tables. (6 marks)
- d) The table below represents typical database model of a medium enterprise. Use the details in this table to answer questions that follow.

Table Staff

StaffNo	FName	LName	Post	Salary	Gender	DOB
1	John	Ken	Messenger	15,000	Male	1958
2	Mary	Oyoo	Manager	130, 000	Female	1967
3	Ben	Munuvi	Driver	25, 000	Male	1947
4	Oliver	Omondi	Watchman	10,000	Male	1954
5	Hamisi	Fazul	Engineer	100,000	Male	1990
6	Fridah	Gakii	Programmer	95,000	Female	1992
7	Lucy	Njeri	Caterer	60, 000	Female	1983

- i. After a go-slow strike from the staff demanding for salary increment, the board of directors decided to increase the salary of all staff by 10%. Write an SQL statement showing how this can be implemented. (3 marks)
- ii. The managers in this enterprise wants a different salary increment of 30%. Write an SQL statement showing how this will be implemented. (3 marks)
- iii. Due to her good performance at work, the board of directors wants to promote Fridah Gakii to a manager and increase her salary by 40%. Represent this scenario by use of an SQL statement. (4 marks)

QUESTION TWO(20 MARKS)

- a) The database is such an integral part of our day-to-day life that often we are not aware we are using one. By giving relevant examples explain FIVE areas of database application. (10 marks)
- b) A small retail shop wants to automate their services. Part of this automation is coming up with a database to store their *customer details, product details and order details*. As a database consultant, define the required database tables for the retail shop. Also, show the relationship by enforcing referential integrity. (10 marks)

QUESTION THREE (20 MARKS)

- a) Databases is a collection of several related tables. Use the following tables to answer subsequent questions.

Table Customer

CustID	FullName	Address	Phone
1	James	NRB	100
2	Daniel	NKR	200
3	Doris	KSM	300
4	Dany	ELD	500
5	Kelly	MSA	600
6	Mary	KILIFI	700
7	Diana	THIKA	400

Table Loans

LoanID	CustID	Amount
10	6	60,000
20	4	40,000
30	2	20,000

- Write an SQL statement to display a list of *FullName, Address, phone, LoanID, Address, Phone, Amount*. (4 marks)
- The bank's employee attempted to delete customer from a customer table but he was not able to do that. Give a reason for this scenario in Databases. (2 marks)
- The database administrator in bank X wanted to add a column called *Location and Repaid Loan* to table customer and Loans respectively. Write an SQL statement to show how this will be achieved. (4 marks)
- Database models are important when coming up with a database. As a database consultant which model would you consider ideal when coming up with a database? Give reasons by highlighting some of the advantages of the model you choose. (10 marks)

QUESTION FOUR (20 MARKS)

- Differentiate between the following (4 marks)
 - Transitive vs Partial dependencies
 - Foreign vs Primary Key
- Normalize the following table called APPOINTMENT to 3 NF (6 marks)

Doctor's_No	Doctor's_Name	Patient's_No	Patient's_Name	Consultation_Date	Consultation_Room_No	Consultation_Room_Name
D01	Vuna	P01	Kombo	05/7/2017	Rm04	Bondox
D01	Vuna	P02	Jumbe	07/7/2017	Rm04	Pegasus
D03	Papa	P03	Hope	08/7/2017	Rm03	Bondox
D03	Papa	P05	Kish	06/7/2017	Rm04	Pegasus

- Normalization is importance for reduction of dependencies in database. Give three advantages and two disadvantages of normalization. (5 marks)
- Create the Table in (4b) above without the data. (5 marks)

QUESTION FIVE (20 MARKS)

a) With the use of suitable notations where necessary, provide the main components of an Entity Relationship Diagram (ERD). (4 marks)

b) Draw a suitable ER diagram based on the following description. (6 marks)

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c) It is known that achieving 100% database security is not possible. However, to protect database we need to take security measures at several levels of the system. Explain **FIVE** levels of database security. (10 marks)