# KIBABII UNIVERSITY

## UNIVERSITY EXAMINATIONS
## 2020/2021 ACADEMIC YEAR

## SPECIAL/SUPPLEMENTARY EXAMINATIONS
## YEAR ONE SEMESTER ONE EXAMINATIONS

## FOR THE DEGREE IN
## COMPUTER SCIENCE

**COURSE CODE : CSC 221**

**COURSE TITLE : DATABASE SYSTEMS 1**

**DATE:** 11/01/2021 **TIME:** 08.00 – 10.00 A.M

**INSTRUCTIONS TO CANDIDATES**

ANSWER **QUESTIONS ONE AND ANY OTHER TWO.**

## QUESTION ONE (COMPULSORY) [30 MARKS]

a) A bus company operates fleet of buses and would like to design the system. The following information shows entities involved in the system.

- Each passenger is booked in one bus.
- A driver can drive more than one bus.
- Buses travel to different destinations.
- The buses can be services in any garage owned by the company.

i) Identify entities in the bus company fleet system. [2 marks]

ii) Use an Entity Relation Diagram (ERD) to show relationship among the entities. [6 Marks]

iii) Identify at least 4 attributes of each entity. [4 Marks]

b) Explain the two major classification of database software [2 Marks]

c) List at least three different types of information that a university would maintain in a database. [3 Marks]

d) Describe four advantages of using database systems. [4 Marks]

e) Using relevant examples differentiate between key attribute and composite attribute.[4 Marks]

f) Describe two database models. [4 Marks]

g) Briefly describe the stages of designing a database conceptual model [5 marks]

## QUESTION TWO [20 MARKS]

a) Consider the following:

Employee (employee_id,employee_name,city,department,date_of_birth)

Customer (customer_id,customer_name,city)

Company (company_name,company_code,city)

Write Mysql statements you will use to;

(i) Create the employee, customer and company table. [4Marks]

(ii) Insert a record in the employee table. [2 Marks]

(iii) Display all records in the employee table. [2 Marks]

b) Describe the structures and rules governing each of the following DBMS models (12 marks)

i) Hierarchical database model

ii) Relational database model

iii) Network database model

## QUESTION THREE [20 MARKS]

a) Using examples explain the following database integrity constraints;

(i) Entity

(ii) Validity

(iii) Referential [6 Marks]

b) Describe the functions of the following tools found in a database management system(DBMS)

(i) Data Definition Language [2 Marks]

(ii) Data Manipulation Language [2 Marks]

(iii) Data dictionary [1 Mark]

c) Outline the symbols used in entity relationship diagram. [5 Marks]

d) Describe two roles played by a database administrator. [4 Marks]

## QUESTION FOUR [20 MARKS]

a) State the type of relationship and draw an Entity Relationship diagram to represent the following:

(i) An employee manages one store and each store is managed by one employee.[2 Marks]

(ii) A painter paints many different paintings, but each painting is painted by only one painter. [2 Marks]

(iii) An employee may learn many job skills and each job skill may be learnt by many employees. [2 Marks]

b) Given the products table below;

| Product_id | Product_name | Quantity | Price |
|---|---|---|---|
| 001 | Book | 50 | 75 |
| 002 | Pen | 100 | 20 |
| 003 | Rubber | 200 | 20 |

Write MySQL statements do the following:

(i) Create the product table and insert the records. [5 Marks]

(ii) Retrieve product_id, product_name and quantity from the product table. [3 Marks]

(iii) Update product table so that the book quantity is 40. [3 Marks]

(iv) Add another column called order_id to the product table. [3 Marks]

## QUESTION FIVE [20 MARKS]

a) Explain the ANSISPARC three level architecture in database system [6 Marks]

b) Differentiate the following terms as used in database systems:

(i) Database and database management system.

(ii) Many to many relationship and one to many relationship

(iii) Primary key and foreign key [6 Marks]

c) Define the following terms as used in a database

(i) Default value [2 marks]

(ii) Validation rule [2 marks]

(iii) Relation schema [2 marks]

d) State **two** functions of a query [2 marks]