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(Knowledge for Development)

KIBABII UNIVERSITY (KIBU)

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATION
YEAR TWO SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF BACHELORS OF SCIENCE
(INFORMATION TECHNOLOGY)**

COURSE CODE : BIT 227

**COURSE TITLE : DATABASE SYSTEM
DESIGN AND DEVELOPMENT**

DATE: 18/04/2023 TIME: 09.00A.M.-11.00A.M. 2HRS

**INSTRUCTIONS TO CANDIDATES
ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Table 1 is an extract from database from a Hotel Management Information System. Study it and answer the questions that follow:

GuestNo	HotelNo	HotelName	GuestName	Address	Date
G102	H101	Tiger	Tony	44, LTO	11/09/2022
G105	H103	Cheetah	Seith	356, NKU	16/09/2022
G107	H101	Tiger	Dave	23, NRB	21/01/2022
G108	H104	Leopard	Donald	45, MTI	24/02/2023

- i) Normalize the data in the table upto the 3rd Normal Form [5 Marks]
 ii) Outline the anomalies eliminated by Normalization [3 Marks]
- b) The following narrative is a representation of information about follow. Use it to answer the questions that:

A doctor in a hospital treats many patients. A patient is identified with a unique patient number. A patient can either an inpatient or an outpatient. An inpatient is a signed a ward with a specific ward name and number. An outpatient is prescribed one or many drugs which are issued after paying to a cashier.

Represent this information in an Entity Relationship Diagram [4 Marks]

- c) A database has a table named Department. Use the table to answer the questions below:

DeptNo	DeptName	DeptHead	Location
HRM202	Human Resource	HR. Manager	Nairobi
FIN101	Finance	Finance Officer	Kisumu
OP201	Operations	Operations Manager	Mombasa

Write an SQL statement that would:

- i) Add a new department (DeptNo- WF100, DeptName- Welfare, DeptHead-Social Manager, Location-Mombasa). [4 Marks]
 ii) Display all records for departments located in Mombasa [2 Marks]
- d) With the aid of an example, describe the different types of dependencies that should identified during the process of normalization [6 Marks]
- e) James wants to design a database for a given set up. Discuss all the steps in the database design cycle that he is supposed to follow. [6 Marks]

QUESTION TWO [20 MARKS]

- a) Show, giving appropriate SQL commands, step by _step how you would go about:
- i. Creating a database called BIT227 with a table named Employee (attributes: Employee_Number, Name, position and Rate) in SQL. [5 marks]
 - ii. Adding two records in the table. [3 marks]
 - iii. Displaying names and rates employees [2 marks]

- b) Using examples, discuss the advantages of using distributed database over a centralized database [6 Marks]
- c) Distinguish between full and partial dependencies as used in database normalization [4 Marks]

QUESTION THREE [20 MARKS]

- a) Explain four benefits of database normalization. [4 marks]
- b) Using examples, Describe the Object Oriented data model [4 Marks]
- c) An organization wishes to computerize its payroll system. During analysis of the current system the following set of data were captured to be used in database design:
- emp_code, emp_lname, emp_education, job_class, emp_dependents, dept_code, dept_name, dept_manager, emp_title, emp_dob, emp_hire_date, emp_training, emp_base_salary, and emp_commission_rate.*
- d) Normalize the above data to 3rd Normal form indicating the objective of each normal form. [12marks]

QUESTION FOUR [20 MARKS]

- a) Differentiate between the term 'Candidate Key' and "Primary Key" [2 Marks]
- b) Aristocrafty, encountered some challenges when they introduced a distributed database management system. Explain three technical challenges that the company may have faced. [6 marks]
- c) Discuss the applicability of the two different approaches used in the design of a database. [6 Marks]
- d) Explain the three types of integrity constraints that must be checked during update operation [6 Marks]
- i. Entity Integrity
 - ii. Domain Integrity
 - iii. Referential Integrity

QUESTION FIVE [20 MARKS]

- a) Discuss the concept 'Relational Model' [2 Marks]
- b) Mercy was hired to coordinate a database project which failed before the completion time, explain three reasons that would have caused this failure [6 Marks]
- c) The following two tables; Customer and Plot, show details of customers and plots respectively. Use them to answer the question that follows.

Customer

CustomerNo	CustomerName	Address
C124	Mike Dike	144, Diani
C446	Jane Nile	356, Maputo
C270	Rita Damian	431, Kile

Plot

PlotNo	CustomerNo	Location	Price
E1001	C124	Kisumu	400,000
E1010	C446	Bungoma	540,000
N2008	C270	Nakuru	790,000
K2004	C446	Mombasa	250,000

Write an SQL statement to:

- i. Create the tables and their respective integrity constraint **[6 Marks]**
- ii. Extract employee details with plots whose price is greater than 500,000 **[3 Marks]**
- iii. Extract the customer with plots in Embu **[3 Marks]**