PAN AFRICA CHRISTIAN UNIVERSITY

Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BIT-BSIT 133

DICTO133

DATABASE SYSTEMS/DATABASE MANAGEMENT SYSTEMS

END TERM EXAMINATION

TIME: 8:00-11:00AM

DATE: APRIL 2026 **TIME: 2 HOURS**

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

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i)Use Table1 and Table2 below to answer questions two, three and four

Owner

Regno	Manufacture date	make	owner	F_Name	L_Name	Physical address	Owner contacts
Kbv111	1/5/20xx	toyota	ow02	John	Kingori	nyeri	07xxxx
Kzm324	4/2/20yy	mazda	ow14	Steve	KipKorir	karatina	020yyyy
Kyy356	6/7/20xx	toyota	ow26	Susan	Mutua	nyeri	073xxxx
Kbm678	5/8/20xx	nissan	ow14	Steve	Kingori	muranga	072yyyy

client

Clientid	carhired	F_Name	L_Name	Contact	Date of hire	purpose	Number of days hired	Cost per day
cl02	Kbv111	mary	ann	07wt34	1/6	Tour travel	5	2000
cl37	Kzm324	steve	KipKorir	020yyyy	2/7	Transport goods	2	500
Clo2	Kyy356	mary	ann	0778uyt	7/8	Transport goods	1	300
cl26	Kzm324	Oloo	smith	07mkoi90	7/8	Passengers services	1	200

SECTION A (COMPULSORY)

QUESTION ONE (15 Marks) Compulsory

a) Explain the following terms;
   i. Database (1 mark)
   ii. SQL (2 marks)
   iii. Relational database (2 marks)

b) Compare and contrast;
   i. Primary key and foreign key (2 marks)
   ii. DDL and DML (2 marks)

c) Explain the different degrees of relationship (6 marks)

SECTION B

(ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (15 marks)

a) Explain the term degree of relationship (1 mark)

b) Differentiate between
   i. A relation and a relationship (1 mark)
   ii. Entity type and an instance of an entity (1 mark)
   iii. Weak and strong entity (2 marks)

c) Explain:

i. The five components of a DBMS environment (5 marks)

ii. how a DBMS provides controlled access to a database (5 marks)

QUESTION THREE (15 marks)

a) Define the term normalization (3 marks)

b) Explain the first three normal forms (6 marks)

c) Discuss the different types of data independence (6 marks)

QUESTION FOUR (15 marks)

a) using an appropriate diagram, explain the three levels of data abstraction (6 marks)

b) Compare and contrast between a Database administrator and a Data Administrator (2 marks)

c) Explain two ways that normalization is used in database design (2 marks)

d) using table1 and table2;

i. State the normal form for each of the tables and explain your answer (2 marks)

ii. A hiring record Showing the registration number, the fname of the owner, the contacts of the owner, the day it was hired, the fname of the client, the contacts of the client, number of days hired and the cost per day (3 marks)

i.

QUESTION FIVE (15 marks)

The above tables are part of the database for a car hire business:

a) Using relational algebra, write equations together with the expected output that would produce the following results.

i. All cars owned by owner called Steve. (2 marks)

ii. List of all owners and clients showing their first names, last name and contacts only (5 marks)

b) draw an appropriate E-R diagram of the resultant tables after normalization (8 marks)

QUESTION SIX (15 marks)

a) Normalize the two tables to 3nf and:

i. List all the resulting tables and their key attributes after the normalization (5 marks)

c) Write an SQL statements that would do the following in an mySQL database

i. create the two tables (5 marks)

ii. update the number of days for the car hire by ann on 7August from I day to 4days and the cost per day to 150/= from 300/= . (5 marks)

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