

PAN AFRICA CHRISTIAN UNIVERSITY

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY
COURSE CODE: DICT0133
COURSE TITLE: DATABASE MANAGEMENT
CAMPUS: ROYSAMBU
EXAM DATE: THURSDAY,XXXX,APRIL,2023
TIME: 8:00AM -11:00AM

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Three questions in Section **B**.
- Write only your **student number** on the answer booklet provided.

SECTION A

(Answer ALL questions in this section)

Question 1:

a) Eldo-Systec Co Ltd has been registering huge losses due to inefficiencies associated with its manual database systems. The company has decided to computerize its database system in order to improve its service delivery. Assuming that you have been hired to set up the new database solution, advise the company about:

i. Two criteria that should be used in selecting the most suitable database management system for the company. **[2 Marks]**

ii. Two approaches that should be used to secure database management systems on the web. **[2 Marks]**

b) Use the table below to answer the questions that follow.

StaffID	F. Name	Department	Salary
001	Peter	ICT	35,000
002	Mary	Leadership	50,000
003	Abraham	ICT	44,000

Staff table

Write SQL expression to:

i. Display *Staffid*, *FName* and *department* of all staff who earn salary above 40,000.

[2 Marks]

ii. Insert the following details into the table staffID=009, FName=Emmanuel, Department=Theology, Salary=60,000.

[2 Marks]

c) The consistency and reliability aspects of transactions are due to the "ACIDity" properties of transactions. By using relevant examples, explain how any two of these properties relates to concurrency control and recovery mechanisms. **[2 Marks]**

SECTION B

(Answer any THREE (3) questions in this section)

Question 2:

a) With the aid of a diagram in each case, describe each of the following attributes as used in databases.

i. Composite

[2 Marks]

ii. Derived

[2 Marks]

b) A company dealing with films has information about stars, movies and studios. Stars have a name and address of the location; movies have a title, year of production, length and the film type, while studios have an owner and a banner. Movies are shot in studios which own them and a movie is shot in only one studio. Stars are connected to one or more studios but can act in film which may not be owned by the studio. Draw an ER diagram to represent the scenario.

[6 Marks]

Question 3:

a) Use the data model below to answer the questions that follow.

Roll_No.	Name	Department
101	Steive	Comp. Sci.
265	Jhoson	Finance
505	Margret	Biology
325	Jenny	Social Sci.
256	Davis	Comp. Sci.
453	Sheryl	Biology
365	Emma	Maths

i. Identify the above data model.

[1 Mark]

ii. State the primary key.

[1 Mark]

iii. Outline two characteristics of the above data model.

[2 Marks]

iv. Explain how schema-based constraints is implemented in the above model.

[2 Marks]

b) Consider the following relational schema:

Employee (empno, name, office, age)

Books (isbn, title, authors, publisher)

Loan (empno, isbn, date)

Write the following queries in relational algebra that:

i. Find the names of employees who have borrowed a book published by McGraw-Hill.

[2 Marks]

ii. Find the names of employees who have borrowed all books published by McGraw-Hill.

[2 Marks]

Question 4:

a) Maria has been requested to develop a database system for an organization. Highlight three computer personnel who are required to help her accomplish this task.

[3 Marks]

b) Write SQL queries for following:

i. Create table EMP with following attributes using suitable data types (Eno, Ename, Deptname, Salary, designation, Joining_Date).

[3 Marks]

ii. Display names of employee whose name start with alphabet 'A'.

[2 Marks]

iii. Increase the salary of employees by 20% who joined after '1/1/2005'.

[2 Marks]

Question 5:

a) Aristocrafty, encountered some challenges when they introduced a distributed database management system. Explain two technical challenges that the company may have faced.

[4 Marks]

b) Premier firm is a software firm dealing with the design of databases. Describe the role of the company in each of the following design phases of a database design.

- i. Conceptual database design **[2 Marks]**
- ii. Logical database design **[2 Marks]**
- iii. Physical database design **[2 Marks]**

Question 6:

Consider the following relation:

OrderItem (OrderNo, ItemCode, Quantity, OrderDate, Description, CustomerNo, CreditLimit, DeliveryAddress)

The following Functional Dependencies (FDs) apply to OrderItem:

FD1 OrderNo, ItemCode, Quantity

FD2 OrderNo, ItemCode, OrderDate

FD3 ItemCode, Description

FD4 OrderNo, CustomerNo

FD5 CustomerNo, CreditLimit

FD6 CustomerNo, DeliveryAddress

- i. Define the two Transitive Dependencies that can be derived from the FDs and give an explanation of the derivation. **[4 Marks]**
- ii. Given the FDs above, normalize the OrderItem to 3NF, showing your intermediate steps. **[6 Marks]**

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