PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT:	**COMPUTING AND INFORMATION TECHNOLOGY**
COURSE CODE:	**BIT106/BCIT106**
COURSE TITLE:	**DATABASE SYSTEMS**
CAMPUS:	**ROYSAMBU**
EXAM DATE:	**XXXXX XXXXX/APRIL,2022**
TIME:	**XXXXX**

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) XYX is a commercial bank whose daily activities involve cash deposits, withdrawals by their customers as well us accounts updates by the bank employees. The bank tellers access customers' accounts with the help of a banking Information System installed in their work stations. These transactions are stored in the bank databases created and maintained within the bank's server room. Identify two database users involved above and state their roles. **[4 Marks]**

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

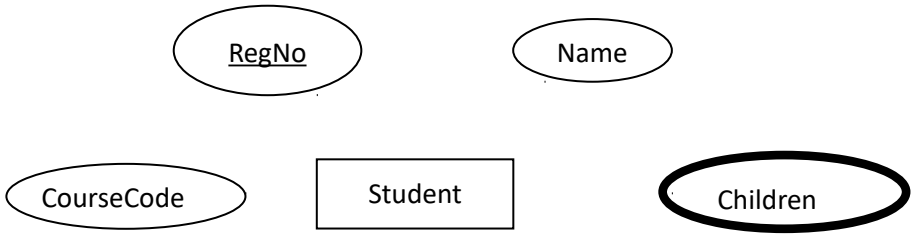
StaffID	F. Name	Department	Salary
001	Peter	ICT	35,000
002	Mary	Leadership	50,000
003	Abraham	ICT	44,000

Staff table

i. Identify the SQL data types that would apply for each of the fields. **[2 Marks]**

iii. Write SQL statement to display *Staffid* and *FName* of all staff working in ICT department **[2 Marks]**

c) Study the model below and use it to answer the questions that follow.



Identify the following:

i. Entity **[1 Mark]**

ii. Two type of attributes used **[1 Mark]**

SECTION B

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

Question 2:

A Country Bus Company owns a number of busses. Each bus is allocated to a particular route, although some routes may have several busses. Each route passes through a number of towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where busses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers have an employee number, name, address and sometimes a telephone number.

Required:

i. Identify six entities from the above information. **[3 Marks]**

ii. Draw an entity relationship diagram to represent the above scenario. **[7 Marks]**

Question 3:

a) The ANSI standards committees have specified transaction behavior on a database according to the ACID principle. Describe the ACID principle and how it relates to database transactions. **[4 Marks]**

b) Table 1 shows details of students.Use it to answer the questions that follow.

Student_ID	StudentName	D.O.B	Course_ID	Gender	Fees_ paid

N001	Jane	23.06.98	SCI104	F	21000
N002	Andrew	22.05.96	SCI101	M	10000
N003	Catherine	18.09.98	SCI102	F	15500
N004	Agnes	16.06.99	SCI104	M	16000
N005	Martin	26.04.98	SCI102	F	30000

Table 1: students

Write relational algebraic expression that would:

i. Display all records of female students who have *paid fees* more than twenty thousand. **[2 Marks]**

ii. Display all the course_ID of the students. **[2 Marks]**

iii. Rename the relation *students* to *student_Marks* and the attribute *student_ID* to *S_ID*. **[2 Marks]**

Question 4:
Table 2 is named *Results* in a database. Use it to answer the questions that follow.

FirstName	**LastName**	**IDNo**	**DOB**	**Marks**
Jane	Jones	123680	23-06-1984	95
Tony	Rock	899011	14-04-1989	60
Jack	Kelly	123956	12-03-1990	75
Jacob	Mayfair	453289	18-06-1994	45
Agnes	Monroe	190012	10-10-1992	88

Table 2: Results

Write an SQL statement that would perform each of the following:

i. Create *results table* shown above where *IDNo* is a primary key. **[3 Marks]**

ii. Insert all the records in the results table. **[3 Marks]**

iii. Display *LastName, IDNo* and *DOB* for all records whose *FirstName* starts with letter *J*. **[2 Marks]**

iv. Display all records whose marks range from 50 to 90. **[2 Marks]**

Question 5:

a) With reference to the tables below, state the following:

i. Primary keys **[2 Marks]**

ii. Foreign key **[1 Mark]**

iii. Relationship that exists between the manufacturer table and the product table [**1 Mark]**

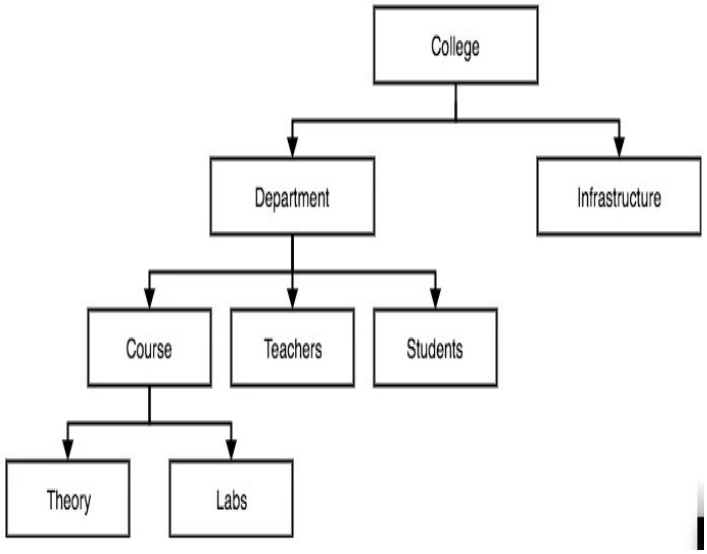
Manufacturers Table

ManufacturerID
Manufacturer Name

Product Table

ProductID
Product description
manufacturerID

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



i. Identify the above data model. **[1 Mark]**

ii. Outline two advantages of using the above data model. **[2 Marks]**

iii. State the type of cardinality used on this data model. **[1 Mark]**

c) Alice designed a database and she realized that there was breach of security of the database of the organization. Outline two measures that she should have put in place to avoid this breach. **[2 Marks]**

Question 6:

The table below lists customer/car-hire data. Each customer may hire cars from various outlets. A car is registered at a particular outlet and can be hired out to a customer on a given date.

CarReg	Make	Model	CustNo	CustName	HireDate	OutletNo	OutletLoc
W565 CDC	Ford	Escort	C100	Smith.J.	14/5/01	21	Woodstock
W565 CDC	Ford	Escort	C222	Patel.V	15/5/01	21	Woodstock
V734 HSB	Nissan	Sunny	C100	Smith.J.	14/5/01	21	Woodstock
W104 RSM	Ford	Escort	C303	Brown. F.	14/5/01	24	Denham

W104 RSM	Ford	Escort	C100	Smith. J.	16/5/01	24	Denham
W611SBH	Nissan	Sunny	C222	Patel.V.	15/5/01	24	Denham

Required:

i.The data in the table is subject to update anomalies.Provide example of how *update and deletion anomalies* could occur on this table. **[4 Marks]**

ii. Identify the *functional dependencies* represented by the data in the table. (State any assumptions you make about the data). **[6 Marks]**

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