

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, AUGUST, 2024

TIME: 2:00PM -5:00PM

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

b) ABC Business Enterprise has been using the traditional database to maintain their records. Explain three disadvantages that they are likely to face by using this approach. **[3 Marks]**

c) Figure 1 shows an entity relationship diagram. Use it to answer the questions that follow:

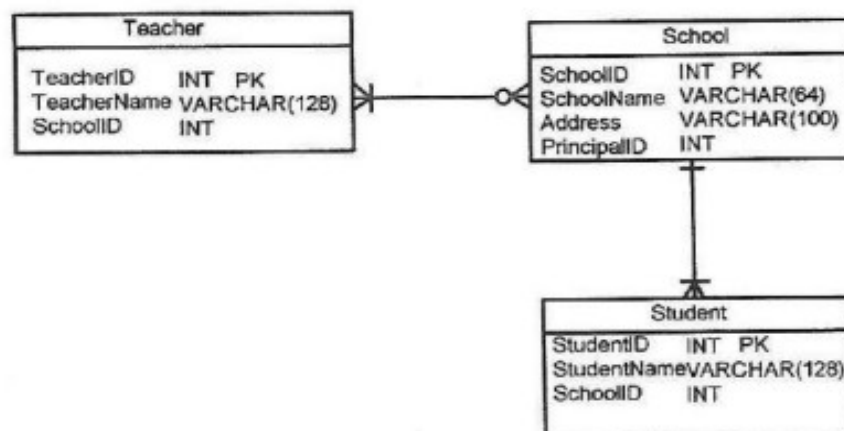


Figure 1

- State the function of varchar(64) as used in the diagram. **[1 Mark]**
- Explain two cardinalities that have been used in the diagram. **[2 Marks]**

d) The following are tables named First and Second in a database.

First

ID	Name
1	Abdi
2	Adam

Second

ID	Name
2	Adam
3	Cale

Determine the output for each of the following algebraic expression operation:

- i. First $\cup$ Second [1
Mark]
- ii. First $\cap$ Second [1
Mark]

SECTION B

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

Question 2:

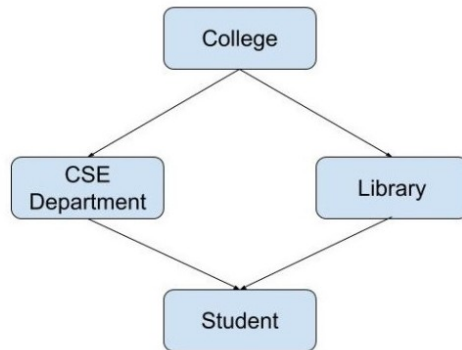
a) A company with branches in different cities opted to use a distributed database system to manage their data. Highlight three benefits that the company will gain from this approach. [3 Marks]

b) In a college, a student is identified by admission number, names which consists of the first and the second name, date of birth and age which is derived from the date of birth, their phone numbers which include that of the guardian. Each student belongs to a class which is identified by a class name. Students are free to register in one or more clubs. Each club is identified by a club name and club identification code. Represent the information using an entity relationship diagram.

[7 Marks]

Question 3:

a) 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]

b) Write the algebraic expression that would perform each of the following in a database:

i. Display vehicles whose brand is Toyota and price is less than Ksh. 1,000,000 from vehicles table.

[4 Marks]

ii. Display brand and colour of vehicles for all vehicles whose brand is Toyota.

[3 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:

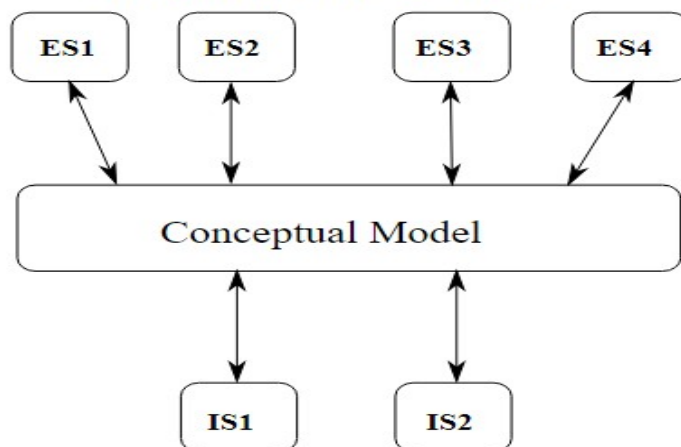
- i. Create *results table* shown above where *IDNo* is a primary key. **[3 Marks]**
- ii. Insert all the records in the results table. **[3 Marks]**
- iii. Display *LastName*, *IDNo* and *DOB* for all records whose *FirstName* starts with letter *J*. **[2 Marks]**
- iv. Display all records whose marks range from 50 to 90. **[2 Marks]**

Question 5:

a) Explain a circumstance under which a database transaction may achieve each of the following properties:

- i. Atomicity **[2 Marks]**
- ii. Consistency **[2 Marks]**

b) The diagram below represents a database schema architecture. Use it to answer the questions that follow.



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i. Identify the database levels labelled:

[2 Marks]

a) ES3

b) IS2

ii. Explain the function(s) of each database level identified in (i) above. **[4 Marks]**

Question 6:

a) Jane 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]**

b) The following is a relation considered to be in its 2nd normal form. Use it to answer the question that follows:

Stproject table

StudentID	ProjectID	StudentName	ProjectName
St001	P001	Jared	Student_Registration
St002	P002	Jane	Patient_Registration
St003	P003	Elias	Road_Maintenance, Student_Registration
St004	P004	Asiba	Library_Registration

i. Explain two reasons why the relation violates the 2NF in normalization.

[4 Marks]

ii. Represent the **Stproject** relation to its 2nd normal form.

[4 Marks]

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