

PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

END OF SEMESTER EXAMINATION

DEPARTMENT: COMPUTING AND INFORMATION TECHNOLOGY

COURSE CODE: BSIT408

COURSE TITLE: ADVANCED DATABASE MANAGEMENT

CAMPUS: ROYSAMBU

EXAM DATE: THURSDAY, XXXXX/AUGUST, 2023

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) Transactions usually cannot be nested inside one another. Explain. **[2 Marks]**

b) Systems do not allow a given transaction to commit changes to databases on an individual basis, that is, without simultaneously committing changes to all other databases. Justify this statement. **[4 Marks]**

c) The human resource department in the office of president wishes to store data concerning its employees. This data entails the employee's surname, middle name and first name. It also stores their KRA pin number, national ID number, diploma, master or doctoral), their job designation (e.g. chief, DO, PC, clerical, secretary, technician etc) and their job group.

Using this information, answer the following questions:

i. Write the SQL statement that will create the database called Human_Resource.

[2 Marks]

ii. Identify two tables that may be used in this database and write their relational schema.

[2 Marks]

SECTION B

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

Question 2:

**Discuss the characteristics
(subject-oriented,**

integrated, time-variant,
non-volatile and
support of management
decision-making process)
that differentiate data
warehouses from
other database systems,
supported by examples

a) Consider the following table structure:

Product (P_code, P_description, P_indate, P_price, P_quantity, V_code)

Vendor (V_code, V_name, V_contact, V_address)

P_code and V_code are the primary keys to the product and vendor tables respectively and V_code is the foreign key in the product table. Write SQL queries that will:

- i. Create the product table.

[2

Marks]

- ii. Output the name of the product with the highest price.

[2 Marks]

- iii. Output the average price of products supplied by a vendor whose code is 0034.

[3 Marks]

iv. Outputs the names of all products alongside the names of the vendors who supply them.

[3 Marks]

Question 3:

a) "A database link connection is one-way". Give reasons supporting or disapproving the statement.

[4 Marks]

b) A leading mobile phone service provider has been in existence for the last fifteen years over that period they have used a database to store all customer transactions. Advise on any three kinds of patterns that can be mined from the data.

[6 Marks]

Question 4:

a) "A data warehouse is subject-oriented, integrated, time-variant and non-volatile." Using an example, explain what is meant by these terms.

[4 Marks]

b) Find out whether the following system is in Deadlock or NOT (Show your argument.)

Total number of processes 3 (P1, P2, P3)

Total number of resources 3 (R1, R2, R3)

P1 holds R1 and waiting for R2

P2 holds R2 and waiting for R3

P3 holds nothing and waiting for R3

[6 Marks]

Question 5:

a) A typical banking institution has several branches and several customers, at a given point in time multiple transactions are taking place. Using illustrations from the given scenario discuss three problems that can arise should the concurrent transactions not be managed. For each problem propose a solution.

[6 Marks]

b) Explain the meaning of "ACID properties of transactions".

[4 Marks]

Question 6:

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a) A mobile company wishes to design systems which are distributed in offices countrywide. State two factors they will consider for the effective working of their systems. **[2 Marks]**

b) XYZ university intends to develop an online examination processing system. The system will enable the students to remotely access their results. Among other requirements security is considered to be a very crucial component of the system. Using the above scenario answer the following questions:

i. Citing examples, highlight the two objectives in designing a secure system.

[4 Marks]

ii. Discuss two major security threats that might face the system and for each threat state a countermeasure. **[4 Marks]**

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