



PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR IN BUSINESS INFORMATION TECHNOLOGY

END OF TERM EXAMINATION

DEPARTMENT: COMPUTING & INFORMATION TECHNOLOGY

COURSE CODE: BIT 106

CAMPUS: ROYSAMBU

COURSE TITLE: DATABASE SYSTEM

EXAM DATE: WEDNESDAY, (6TH DECEMBER 2017)

TIME: START HOUR – END 09:00-12:00 HRS

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Four questions in Section **B**.
- Write only your **student number** on the answer booklet provided.
- None programmable calculators permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

SECTION A

(Answer ALL questions in this section)

Question 1:

- I. Define the following terms as used in databases: (4 Marks)
 - a. Database
 - b. Database Management System (DBMS)
 - c. Data Definition Language
 - d. Data Manipulation Language
- II. State **FOUR** types of database management systems. (4 Marks)
- III. Highlight **FOUR** characteristics of database management systems. (4 Marks)
- IV. Differentiate between Database Schema and Database instance. (2 Marks)
- V. Explain the term transitive dependence as used in database design. (2 Marks)
- VI. Sharon intends to carry out the conceptual database design in her organization. Using an ERD describe two relationships she is likely to model. (4 Marks)

SECTION B

(Answer any FOUR (4) questions in this section)

Question 2:

- I. Define the following properties of transaction. (4 Marks)
 - a. Atomicity
 - b. Consistency
 - c. Isolation
 - d. Durability

- II. Explain **THREE** causes of database failure. (6Marks)
- III. Using a diagram explain the states of a database transaction. (6 Marks)
- IV. PAC University intends to install a database system in order to improve its image as per the ISO requirements. Discuss **TWO** benefits that would be realized from this decision. (4 Marks)

Question 3:

- I. Define the following terms as used in data system concepts and architecture (2 Marks)
 - a. Data Abstraction
 - b. Data Model
- II. Describe **TWO** categories of a data model (4 Marks)
- III. Differentiate between key constraint and referential integrity as used in databases. (2 Marks)
- IV. With the aid of a diagram, describe the three-schema database architecture. (6 Marks)
- V. A DBMS has users with different rights and permissions who use it for different purposes. Some users retrieve data and some back it up. Explain **THREE** categories of database system users. (6 Marks)

Question 4:

- I. Define the following terms as used in database management (4 Marks)
 - a. Non-key Attribute
 - b. Composite Key
 - c. Primary Key
 - d. Candidate Key

II. Identify **THREE** factors you would consider when designing a database.
(6Marks)

III. Examine the Student table below and attempt the proceeding questions

Student_id	Student_Name	Age
101	Florence	15
102	Ian	18
103	James	14

- Write SQL statement that could be used to create the table. Set the **Student_ID** as the primary key and use appropriate data type for each field.
(3 marks)
- Write SQL statement that could be used to create the table (2 Marks)
- Write SQL statement that could be used to insert the student details(3 Marks)
- Write an SQL statement that could be used to delete the above table (2 Marks)

Question 5:

- I. Highlight **TWO** performance measures of a disk (2 Marks)
- II. State **TWO** types file organization used to organize file records. (2 Marks)
- III. Explain **THREE** characteristics of physical media storage devices (6Marks)
- IV. Explain **TWO** disk optimization techniques (4Marks)
- V. A computer system has a well-defined hierarchy of memory. With the aid of a diagram demonstrate how the computer memory is organized into a hierarchical model (6 Marks)

Question 6:

UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type, unique ID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e., flights, truck deliveries).

These transportation events are characterized by a unique schedule Number, a type (e.g, flight, truck), and a delivery Route

- I. Create an Entity Relationship diagram that captures this information about the UPS system. Be certain to indicate identifiers and cardinality constraints. (5Marks)
- II. Identify the Primary keys correctly in the case study (5 Marks)
- III. Identify and indicate the cardinalities in the ERD diagram you draw in a above (5 Marks)
- IV. Correctly show the relationship between the entities in the diagram in (a) above (5 Marks)

Question 7:

- I.

Student	Age	Subject
Adam	15	Biology, Maths
Alex	14	Maths
Stuart	17	Maths

 Differentiate between physical data independence and logical data independence (2 Marks)
- II. Normalization is a method to remove anomalies and bring the database to a consistent state. Describe **THREE** database anomalies (6 Marks)
- III. State **THREE** advantages of normalization as used in databases. (3Marks)
- IV. A student at PAC University is given the following table to normalize
- Normalize the table above to First Normal Form (4Marks)
 - Normalize the table to Second Normal Form (5 Marks)