



PAC INSTITUTE OF TECHNOLOGY AND SOCIAL STUDIES MAY – AUGUST 2025 ASSESSMENT

FORMATIVE ASSESSMENT

Qualification / Course : COMPUTER SCIENCE LEVEL 6

Unit of Competency : DESIGN AND DEVELOP DATABASES

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO THE CANDIDATE:

- 1. Read all the instructions carefully before attempting the questions.*
- 2. This paper consists of two sections, A & B.*
- 3. You are allowed 3 Hours to Answer the questions.*
- 4. Marks for each question are indicated in brackets.*
- 5. Write your responses in the Separate Answer booklet provided.*
- 6. Do not write anything on this question paper.*

SECTION A: (40 MARKS)

Answer ALL the questions in this section

1. Define the following terms
 - i. Database schema (1 mark)
 - ii. Database Instance (1 mark)
 - iii. Database Management System (1 mark)
 - iv. Relation (1 mark)
2. Explain **FOUR** ways in how databases can be classified based on number of sites over which Database is Distributed (4marks)
3. Elaborate any **FOUR** advantages that database management systems offer in order to overcome the disadvantages of file systems in data storage (4marks)
4. Differentiate between Data Definition Language versus a Data Manipulation Language and use at least one example of each to illustrate your explanation. (4 Marks)
5. Explain the following transaction concept.
 - i. Grant (1 mark)
 - ii. Revoke (1 mark)
 - iii. Commit (1 mark)
 - iv. Rollback (1 mark)
6. Explain **FOUR** benefits of normalizing database containing relations (4marks)
7. Describe any **FOUR** constraints used in SQL (4marks)
8. Explain **FOUR** techniques that are used to perform Database Testing. (4marks)
9. Describe the following types of keys as used in database management system
 - i. Primary Key
 - ii. Foreign Key
 - iii. Candidate Key
 - iv. Super Key(4marks)
10. Distinguish between a weak entity and a derived entity as used in Entity Relationship diagram (4marks)

SECTION B (60 MARKS)

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

QUESTION 11 (20mks)

- i. A process in a transaction is said to successfully terminate after attaining “acidity”. Describe the ACID properties of a transaction illustrating with examples for each state

(8marks)

- ii. Study the following scenario then attempt the question part that follow:-

Mombasa port Authority is a company that maintains first-hand information on the processing and current whereabouts of each shipped goods. It has a computerized system for shipped goods. The shipped goods are recorded into the system by considering their item number which is unique, weight, dimensions, insurance amount, destination, and final delivery date. The shipped goods are keyed in into the computerized system in a single retail center. The retail centers are categorized by their type, uniqueID, and address. Shipped goods are transported to their main destination by the use of Mombasa transportation events (i.e., flights, truck deliveries). The transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a deliveryRoute. Create an Entity Relationship diagram that captures this information about the Mombasa Computerized System. Indicate identifiers and cardinality constraints.

(12marks)

QUESTION 12 (20mks)

- a. Outline **six** features of a *database management system*. (6 marks)
- i. Distinguish between *logical database designer* and a *physical database designer*.

(4

marks)

- ii. Table 2 shows details of furniture stored in a database. Use it to answer the questions that follow.

ITEM CODE	ITEMNAME	QUANTITY	ITEMPRICE	STATUS
F0001	Beds	300	12000	EXCESS
F0010	Tables	200	7000	EEXCESS
F0003	Sofa sets	100	35000	EXCESS
F0011	Ward robe	50	18000	REORDER
F0014	Computer desks	145	3000	EXCESS

F0002	Chairs	45	1600	REORDER
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Table 2: Furniture

- b. Write SQL statements that would;
- Extract details of items whose *item name* starts with letter c;
(2marks)
 - Determine the cost of each item and store them in a field named *total cost*.
(2marks)
 - extract all the details whose *item price* is greater than 15000 and the *item name* ends with s;
(2marks)
 - Sort items according to *item code* in ascending order.
(2marks)
 - Delete the item whose *item code* is f0014 from the table;
(2marks)

QUESTION 13 (20marks)

- Securing a database aims to achieve the following objectives
 - Data Confidentiality
 - Data Integrity
 - Availability

Briefly describe what is meant by each of the above objectives. In each name one security controls that can be applied in Database (9marks)

- Discuss **THREE** methods of backups used in database (6marks)
- Discuss **FIVE** Properties of a Primary Key (5marks)

QUESTION 14 (20marks)

- Describe three cardinalities used in database
(6marks)
- With the aid of a well labelled diagram, discuss the three levels of abstraction in a database
(8marks)
- Discuss any three major components of a database
(6marks)