

061306T4CSC

COMPUTER SCIENCE LEVEL 6

ICT/OS/CS/CR/05/6

Demonstrate Database Management Skills

March/April 2026



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

Time: 2 HOURS

INSTRUCTIONS TO CANDIDATE

1. The paper consists of **TWO** sections: **A** and **B**.
2. Answer **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet
5. Do not write on this question paper.

This paper consists of FIVE (5) printed pages

**Candidates should check the question paper to ascertain that all pages
are printed as indicated and that no questions are missing.**

SECTION A (40 MARKS)

Answer ALL questions in this section.

1. State FOUR ways in which databases are used to support business operations.
(4 marks)
2. In an organization set up, different users interact with the database at different data abstraction levels to access different details of the data. State the THREE levels of data abstraction in Database Management Systems.
(4 marks)
3. As a database assistant, identify FOUR keys you require to manage the records properly.
(4 marks)
4. A telecommunications company stores millions of customer call records in a database. Identify TWO database performance techniques that will speed up retrieval of records using customer numbers and call IDs.
(4 marks)
5. A retail store is developing a Product Inventory Database. The database administrator needs to define various schemas for the database, identify FOUR SQL commands that can be used for the tasks.
(4 marks)
6. A software developer is designing a Library Management System using an object-oriented database. Identify FOUR object-oriented concepts that can be applied in this system.
(4 marks)
7. In a learning management system, creation of a payment object requires the use of triggers to automatic course enrollment for the learner. Explain how triggers support automation in this object-oriented database scenario.
(4 marks)
8. Mike designed a database using an Entity Relationship Diagram (ERD). Using symbols outline FOUR connotations of ERD he could use.
(4 marks).
9. In a computerized system, users must interact with stored data to keep it accurate and up to date. Identify FOUR basic database operations that enable users to manage data in such systems.
(4 marks)
10. Database system has several components that work harmoniously to achieve a common stated goal. Explain FOUR of such components of a database system.
(4 marks)

SECTION B (60 MARKS)*Answer THREE questions in this section***11.**

- a) The following are tables named *First* and *Second* in a database. Use it to answer the questions that follow:

First		Second	
ID	Name	ID	Name
1	Abdi	2	Adam
2	Adam	3	Cale

Determine the output for each of the following relational algebra expression operation:

- (i) First $\cup$ Second
 - (ii) First $\cap$ Second (4 marks)
- b) A college uses a relational database to manage student records. The database is designed using tables that follow the relational database model. Explain the following as used in relational database model: (10 marks)
- i) Table;
 - ii) Tuple;
 - iii) Attributes;
 - iv) Relation schema;
 - v) Domain.
- c) Explain the THREE types of relationships that are applicable in relational databases. (6 marks)

12.

- a) Read the following scenario and use it to answer the question that follows:

An insurance company needs to store information about car accident claims in its database. Each insured vehicle is identified by vehicle registration number, the vehicle model, and the year of manufacture. The owner of the vehicle is identified by ID number, name and contact. A car owner may have more than one vehicle insured.

When a vehicle is involved in an accident, the driver is expected to report to the nearest police station where a report number, the location of the accident and the date/time when the accident took place is recorded. When an accident occurs, the driver's details including ID number, name and driving license number are recorded.

Represent the information in an entity relationship diagram using cardinality and participation constraints. (8 marks)

b) Write the structured query language statements 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 0000 from vehicles table. (4 Marks)

(ii) Display brand and colour of vehicles for all vehicles whose brand is Toyota. (4 Marks)

(iii) Display all the Toyota brand vehicles whose drive mode is 4WD (4 marks)

13.

a) Data Definition Language (DDL) is a subset of SQL used to define and manage the structure of database objects. Describe key database objects that can be created and managed using DDL commands. (10 Marks)

b) Table 4 shows an extract of assessment schedule for students in a college. Normalize the table to 3NF, showing the steps. (10 marks)

No	IName	AdmNo	Lecture r	Lecturer Code	UnitID	Asesor Code	Assessor name	Date Assessed
1	Beatrice	444	Bilah	L21	U02	A01	Daniel	07/10/21
					U14	A02	Wenda	03/12/21
					U12	A04	Omanga	23/02/22
2	James	445	MWangi	L22	U13	A04	Engren	25/10/21
					U07	A04	Omanga	06/03/22

Table 4

14.

- a) A medium-sized company wants to computerize its operations and must select database software that best fits its needs. Outline FOUR factors they can consider when choosing the type of database software to adopt. (4 marks)
- b) A college uses a database to manage students and the courses they are enrolled in. The database contains the following two tables:

STUDENT (StudentID, StudentName, CourseID)

COURSE (CourseID, CourseName, Department)

Using the above tables, write queries to retrieve the following information;

- (i) Display the StudentName and CourseName for all students who are enrolled in a course. (2 marks)
- (ii) Display all students, including those who are not yet enrolled in any course. (2 marks)
- (iii) Display the CourseName and Department for courses that currently have no students enrolled. (2 marks)
- (iv) Identify the type of SQL JOIN used in parts (a), (b), and (c). (2 marks)
- c) The design and functionality of a database rely heavily on its underlying data model. Discuss FOUR of such data models used to organize data. (8 marks)