**061006T4ICT**

**ICT TECHNICIAN LEVEL 6**

**IT/OS/ICT/CR/7/6**

**MANAGE DATABASE SYSTEMS**

**JULY/AUGUST 2023**

**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION**

**COUNCIL (TVET CDACC)**

**WRITTEN ASSESSMENT**

**TIME: 3 HOURS**

**CANDIDATE INSTRUCTIONS**

1. This paper has two sections **A and B.** Attempt questions in each section as per instructions given in the section.

2. You are provided with a separate answer booklet.

3. Marks for each question are indicated in the brackets.

4. Do not write on the question paper

**This paper consists of SIX (6) 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)

*Attempt ALL questions in this section.*

1. Describe each of the following components of a database

   a) Stored procedures (2 Marks)

   b) Tables (2Marks)

   c) Triggers (2 Marks)

2. Explain the functions of the following in a database management system.

   a) Data Manipulation Language (2 Marks)

   b) Data Definition Language (2 Marks)

3. Outline FOUR components of a database management system. (4 Marks)

4. State the meaning of ACID in database management system (2 Marks)

5. Differentiate between active and passive data dictionaries (2 marks)

6. An organization intends to acquire a database application to manage its big data. Describe THREE professionals that may be required to implement. (6 Marks)

7. The principal from Kina institute noticed that there was a lot of data duplication of student's details within the system. Identify TWO issues that may arise as a result of data duplication

   (4 Marks)

8. Highlight FOUR characteristics of a well-defined database system. (4 Marks)

9. Elucidate FOUR merits of a distributed database (4 Marks)

10. Identify FOUR disadvantages of file-based system (4 Marks)

**SECTION B: (60 MARKS)**

*Attempt any THREE (3) questions in this section*

11.

a)  Explain FIVE preventive mechanisms of data and information within database system in an organization.                                          (10 Marks)

b)  The table below is named *Employee* in a database. Use it to answer the questions that follows.

| Staff no | fname | lname | position | sex | salary | department |
|----------|-------|-------|----------|-----|--------|------------|
| 2345 | Faith | Wanjiku | Manager | f | 90000 | Finance |
| 1234 | Vivian | Chemutai | Clerk | f | 34000 | Finance |
| 5678 | Collins | Adika | Salesman | m | 42000 | Sales &marketing |
| 9033 | Steven | Leon | Salesman | m | 42000 | Sales & marketing |
| 9812 | Romanus | Njuguna | Clerk | m | 34000 | Finance |
| 2312 | Nelly | Kambua | Clerk | f | 34000 | Finance |
| 1567 | Lydia | Orina | Salesman | f | 42000 | Sales& marketing |
| 4511 | Romina | Kenia | Supervisor | f | 67000 | logistics |
| 2025 | Ronex | Rodgers | supervisor | m | 67000 | logistics |

Write a SQL statement that would perform each of the following;

i)  Display all records from the fields: *fname, lname* and *department*.                 (2 Marks)

ii)  Display all the records whose position is clerk                                  (2 Marks)

iii)  Arrange all the records descending order based on employee salary.                 (2 Marks)

iv) Display all records for employees who belong to finance department. (2 Marks)

.

v) Display all employees whose first name starts with letter R (2 Marks)

12. Code introduced the concept of normalization and what is now known as 1NF in 1970, He went on to define 2NF and 3NF in 1971

   a) Define Normalization as used in database. (2 Marks)

   b) Explain FOUR benefits an organization would gain by normalizing its database.

   (8 Marks)

   c) The table below is in de-normalized form;

*Students _table*

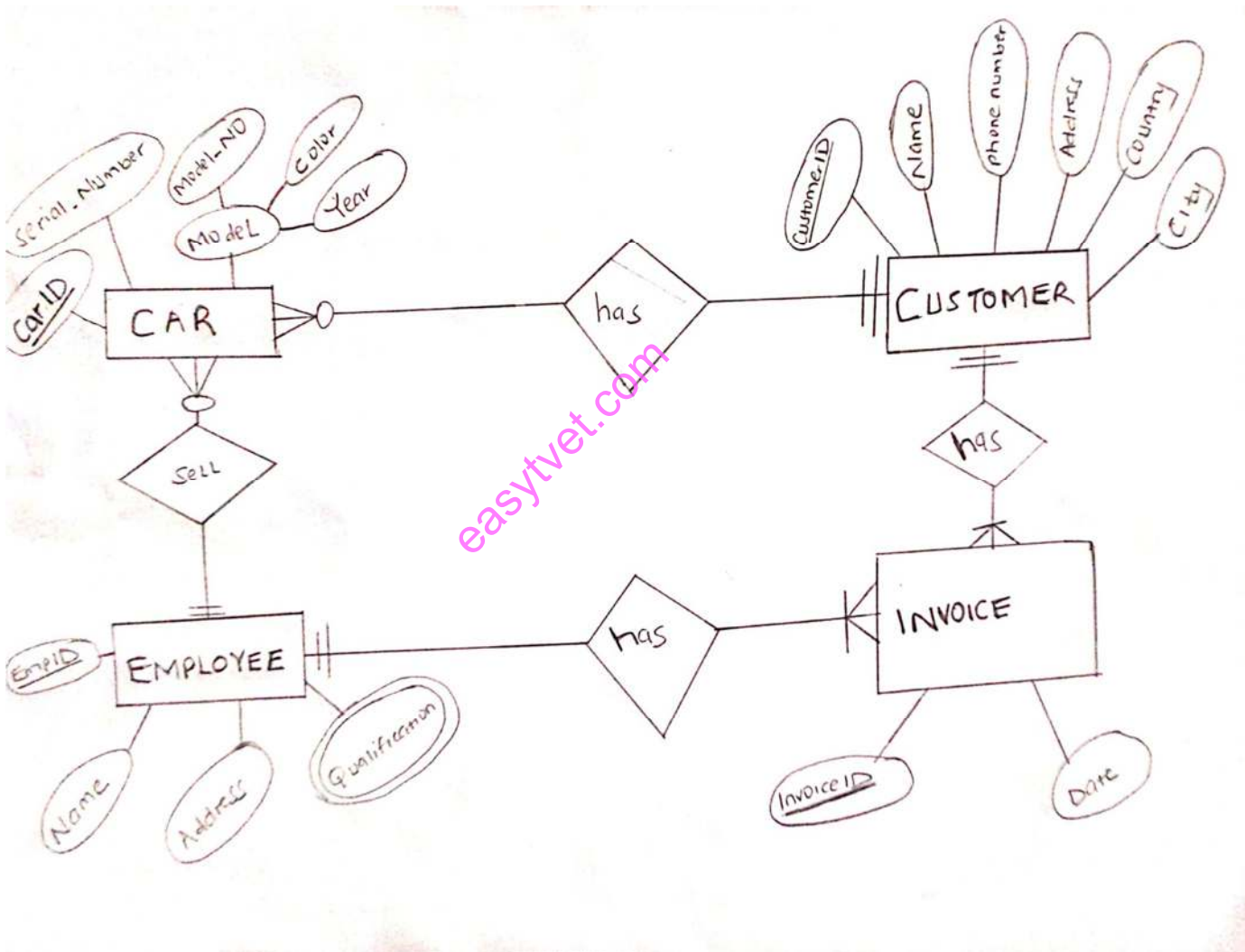| Student name | D.O.B | Course title | grade |
|---|---|---|---|
| Radull Collins | 12.4.1990 | Maths,chemistry | A,C |
| Murvin akon | 3.3.2000 | Economics | A |
| Rashid kayler | 14.12.1998 | Maths , biology | B,B |
| Vivian Lukas | 25.12.2003 | Chemistry, physics | C,B |
| Tania james | 7.11.1995 | Biology | A |
| Caleb moses | 19.12.2002 | Maths | B |
| Fatuma mustafa | 1.1.2001 | Biology, chemistry | B,A |

Normalize the table above to;

   i) 1NF (3 Marks)

   ii) 2NF (3 Marks)

   .

   iii) 3NF (4 Marks)

13.

a) Explain TWO benefits of constraints in a database management system.

(4 Marks)

b) Discuss THREE levels of database design. (6 Marks)

c) Transform the ER diagram into a relational schema. (10 Marks)



14.

a) ICT department has been proposing the use of Database Management System within the organization. Explain FOUR factors that should be considered before implementing the proposed system (8 Marks)

b) Describe the following functional dependencies

      i)   Partial dependency                                                                  (3 Marks)

      ii)   Transitive dependency                                                 (3 Marks)

c)      The table below shows an excerpt of employee details at Semaj Company. Use it to answer the questions that follows.

| Employee number | Employee name | Department no | Department name | Department manager |
|---|---|---|---|---|
| C935 | John simon | 102 | Finance | Mr cleopas |
| C678 | Frank Lukas | 101 | Human resource | Dr. machoka |
| C654 | Joan kirui | 103 | Accounts | Dr. Samuel |
| C922 | Flora atieno | 102 | Finance | Mr. cleopas |
| C987 | Denis keli | 104 | marketing | Miss risper |

Identify the scenarios in the table that may lead to occurrence of each of the following anomalies:

  i)   Update anomalies                                                    (2 Marks)

  ii)   Deletion anomalies                                                (2 Marks)

  iii)   Insertion anomalies                                             (2 Marks)