DISTRICT TVET COMPREHENSIVE ASSESSMENT

ACADEMIC YEAR 2022-2023

MARKING GUIDE

SECTOR: INFORMATION COMMUNICATION AND TECHNOLOGY (ICT)

TRADE: SOFTWARE DEVELOPMENT

RTQF LEVEL: IV

MODULE CODE AND TITLE: SFDSF401, BASICS AND FUNDAMENTALS OF DATABASE

DURATION: 3HOURS

INSRTUCTION TO CANDIDATES:

Instructions: This Assessment Consist three (3) sections A, B and C

Section A: All compulsory.   55marks

Section B: All compulsory   30marks

Section B: Choose only one (1) question   15 marks

SECTION A: ATTEMPT ALL QUESTIONS   55marks

Q1. Define the following term:**/4marks**

 a. Data   **b**. database   **c**. Entities   **d**. attributes **e.** information

Marking scheme

- **a.** Data: all the single items that are stored in a database.   **/1mark**
- **b.** Database: is a collection of related data that is organized. **/1mark**
- **c.** Entities: is an object that exists   **/1mark**
- **d.** Attributes: the information about the entity that needs to be stored or is characteristic of an entity.   **/1mark**
- **e.** Information: processed data is termed as information i.e data been contextualized, calculated, categorized and condensed. **/1mark**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 1: Analyze database requirement, Learning Outcome1.1: Define database key terms, models, types and relationships, page 266.

Q2. List 3 types of relationships. **/5marks**

Marking scheme:

- ➢ One to One /**2marks**
- ➢ One to many**2marks**
- ➢ Many to Many**1mark**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 1: Analyse database requirement, Learning Outcome1.1: Define database key terms, models, types and relationships, page 266.

Q3. Choose the correct answer for the following sentence**:** Which SQL statement is used to add new data or record in a database? /**5mark**

a) INSERT INTO	c) INSERT NEW
b) ADD NEW	d) ADD RECORD

Q4. Outline any four different types of database model **/5Marks**

Marking scheme

- ➢ Relational database **/1mark**
- ➢ Hierarchical database **/1mark**
- ➢ Network database **/1mark**
- ➢ Object oriented model **/1mark**
- ➢ Entity-relationship Model **/1mark**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 1: analyze database requirement, Learning Outcome1.1: Define database key terms, models, types and relationships.

Q5. Define constraints. List and explain 3 types of constraints **/5marks**

Marking scheme

Constraints are the rules enforced on data columns on a table. These are used to limit the type of data that can go into a table**.**

Types of constraints (each carry out 1mark)

- ➢ Primary key constraint: uniquely identifies each record in a table
- ➢ Foreign key constraint: uniquely identifies each a row/ record in any another database   table
- ➢ Unique key constraint: ensures that all values in a column are different.
- ➢ Not null constraint: ensures that a column cannot have a null value.
- ➢ Check constraint: The CHECK constraint ensures that all values in a column satisfy certain conditions.

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.2: Identify the constraints, page273.

6. Complete the description column in this table based each DB constraints**/5marks**

Answer:

The five types of CONSTRAINTS are:

NO	Constraint	Description
1.	Primary key constraint	constraint uniquely identifies each record in a table Primary keys must contain UNIQUE values, and cannot contain NULL values. A table can have only ONE primary key; and in the table, this primary key can consist of single or multiple columns (fields).
2.	Foreign key constraint	Uniquely identifies a row/record in any another database table
3.	Unique key constraint	Ensures that all the values in a column are different.
4.	Not null constraint	Ensures that a column cannot have a NULL value.
5.	Check constraint	The CHECK constraint ensures that all values in a column satisfy certain conditions.

Reference: LO 2.2 – Identify the constraints

Q7. Explain the terms 'Record', 'Field' and 'Table' in terms of database. **5Marks**

Marking Scheme

A **Record** is composed of fields and contains all the data about one particular person, company, or item in a database. **2marks**

Table is composed of records and fields that hold data. Tables are also called datasheets. Each table in a database holds data about a different, but related.**2marks**

A **Field** is part of a record and contains a single piece of data for the subject of the record. A field or article or attribute is a propriety which characterizes an object. **1mark**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 1: analyze database requirement, Learning Outcome 1.3: Determine the information that the database is required to hold.

Q8. Differentiate primary key and foreign key **5marks**

Marking scheme

A primary key uniquely identifies each record in the table. It is a type of candidate key that is usually the first column in a table and can be automatically generated by the database to ensure that it is unique. **2.5marks**

Foreign key: Uniquely identifies a row/record in any of the given database table. A foreign key is another candidate key (not the primary key) used to link a record to data in another table. **2.5marks**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.2: Identify the constraints.

Q9. Give any five objectives of database management system **5Marks**

Marking scheme:

The objectives of database management system can be as follows:
1. Eliminate redundant data.
2. Make access to the data easy for the user.
3. Provide for mass storage of relevant data.
4. Protect the data from physical harm and un-authorized systems.
5. Allow for growth in the data base system.
6. Make the latest modifications to the data base available immediately.
7. Allow for multiple users to be active at one time.
8. Provide prompt response to user requests for data.

Advantages of database management system:

➢ Read database data;
➢ Modify (insert, update, or delete) database data;
➢ Maintain database structures;
➢ Enforce rules;
➢ Control concurrency;
➢ Provide security;
➢ Perform backup and recovery
➢ Integrity
➢ Data Independence
➢ Shared Data
➢ Conflict Resolution
➢ Reduction of Redundancies

➢ Create supporting structures (e.g indexes)

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.3: Develop a data dictionary.

Q10. Give any five advantages of database management system **/5marks**

Advantages of database management system:

➢ Read database data;
➢ Modify (insert, update, or delete) database data;
➢ Maintain database structures;
➢ Enforce rules;
➢ Control concurrency;
➢ Provide security;
➢ Perform backup and recovery
➢ Integrity
➢ Data Independence
➢ Shared Data
➢ Conflict Resolution
➢ Reduction of Redundancies

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.3: Develop a data dictionary.

Q11. Identify and explain 3 methods used to collect the information. **5marks**

Marking scheme Identify METHODS TO COLLECT DATA :(each carry out 0.25mark)

➢ Interview

➢ Documentation

➢ Questionnaire

➢ Observation

Explain methods used to collect the information. (**each carry out 1mark)**

1. **Interview:** an interview is formal meetings between two people (the interviewer and the interviewee) where questions are asked by the interviewer to obtain information. Those questions should be clear, objective and simple.
2. **Documentation:** Is a set of documents provided on paper, or online, or on digital or analog media. The documentation represents the biggest source of information in a given organization.

3. **Questionnaire:** Is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. This technique is almost like interview, but the only difference is that the designer doesn't have   to meet employees. He prepares his questionnaire before and submits it to the employees who fill it. He collects it later after being filled.
4. **Observation:** means viewing, seeing or the action or process of closely observing or monitoring something happening. The designer has to visit therefore the places where processes are made.

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE

learning unit 1: Analyze database requirement, Learning Outcome1.2: Review

organizational and task requirements to identify user requirement.

SECTION B: ATTEMPT ANY 3 QUESTIONS   30marks

Q12. Write syntax of how to create database by using xampp, create table with its attributes and insert new record in created table. **10marks**

Marking scheme

Syntax of create database **2marks**

CREATE DATABASE database-name;

Syntax of create table **4marks**

```
CREATE TABLE table-name (
    column1 data-type constraint,
    column2 data-type constraint,
    column3 data-type constraint,   ....
);
```

Syntax of insert new record in created table **4marks**

INSERT INTO table name (column1, column2, column3, column n) VALUES (value1, value2, value3,valuen);

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE

Learning unit 3: Create Database, Learning Outcome 3.1: Create tables and attribute.

Q13. Consider the table BOOKS below: /**10Marks**

Book ID	Book name	Edition	Author	Published date	Number
B001	Web design	Ed2	H.olivier	1997	30
B002	Database	Ed1	P. Albert	2001	20
B003	VB	Ed3	M.Claude	1985	14
B004	Web design	Ed1	J.Mata	1998	26

By using the table above, write the SQL commands do the following:
a. Write SQL query to create the table BOOKS   /**4marks**
b. Inserting a new record into the table BOOKS   /**3marks**
c. Write SQL query to display all records from BOOKS. /**3marks**

Marking scheme

a. Create table BOOKS(Book_ID varchar(20) not null primary key, Book_name varchar(40),Edition varchar(10),Author varchar(10), Published_date varchar(5),Number int);   /**4marks**
b. INSERT INTO BOOKS (Book ID, Book name, Edition, Author, Published date, Number)VALUES ('B005', 'JavaScript', 'Ed1', 'Abiud. B', '2019',31); /**3marks**
c. Select*from BOOKS; /**3marks**

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE Learning unit 3: Create Database, Learning Outcome 3.1: Create tables and attributes.

Q14. a. Define entity relationship diagram (ERD)

   b. List, name and draw Common Entity Relationship Diagram Symbols

10marks.

Marking Scheme

Entity relationship diagram (ERD): is a means of visualizing how the information a system produces is related. is a type of flowchart that shows the relationships of entity sets stored in a database. **2marks**

b.   1.Entities: which are represented by rectangles. **2marks**

ENTITY

2.Actions: which are represented by diamond shapes, show how two entities share information in the database. **2marks**

Relationship

3.Attributes: which are represented by ovals. **2marks**

Attribute

4.Connecting lines, solid lines that connect attributes to show the relationships of entities in the diagram. **1mark**

5. Cardinality specifies how many instances of an entity relate to one instance of another entity. **1mark**

1:M, M:1, 1:1,M:M.

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.1: Design an entity relationship diagram (ERD).

Q15. Briefly explain any five goals of DBMS. **10Marks**

Marking scheme

Five goals of Database Management System are:

(1) To remove problem of data redundancy and inconsistency- Different programmers create files and application programs over a long period and these files are likely to have different format and programs are written in different languages. Same information may be duplicated in various files.

(2) Easy access of data- If a bank officer needs to find out names of all customer who live within a particular postal- code area, the officer then ask the data processing department to generate such a list, because the designers of original database system did not anticipate this request, there is no application program on hand to meet it, there is however an application program to generate the list of all customer.

(3) To solve data isolation problem- As data are scattered in various files, and files may be in various formats, writing new application programs to retrieve the appropriate data is difficult.

(4) To solve atomicity problem- A computer system may fail. In many applications it is crucial that, if a failure occurs the data be restored to the consistent state that existed prior to the failure. E.g. let us having a program to transfer $ 50 from account A to account B. If a system failure occur during the execution of program, it is possible that the $ 50 was removed from account A bit was not clearly it is essential to data consistency that either both the credit and debit occur or that neither occur. That is fund transfer must be atomic- it must happen in it's entirely of not at all, it is difficult to ensure atomicity in a conventional file - processing system.

(5) To solve problem of concurrent- access anomalies- For the sake of overall performance of the system and faster response, many systems allow multiple users to update the data simultaneously.

(6) To solve security problem- Not every user of database system should be able to access all the data. For example in a banking system, the payroll personnel is allowed to see only that part of the database that has information about the various bank employees. They do not need access to information about customer accounts.

(7) To solve integrity problems- The data values stored in database must satisfy certain consistency constraints.

SECTION C: CHOOSE ONE QUESTION   15MARKS

Q16. Given the following CMD and translate into LMD, before identify all entities, attributes ,name of relationship between entities and their cardinalities among them.**15marks.**
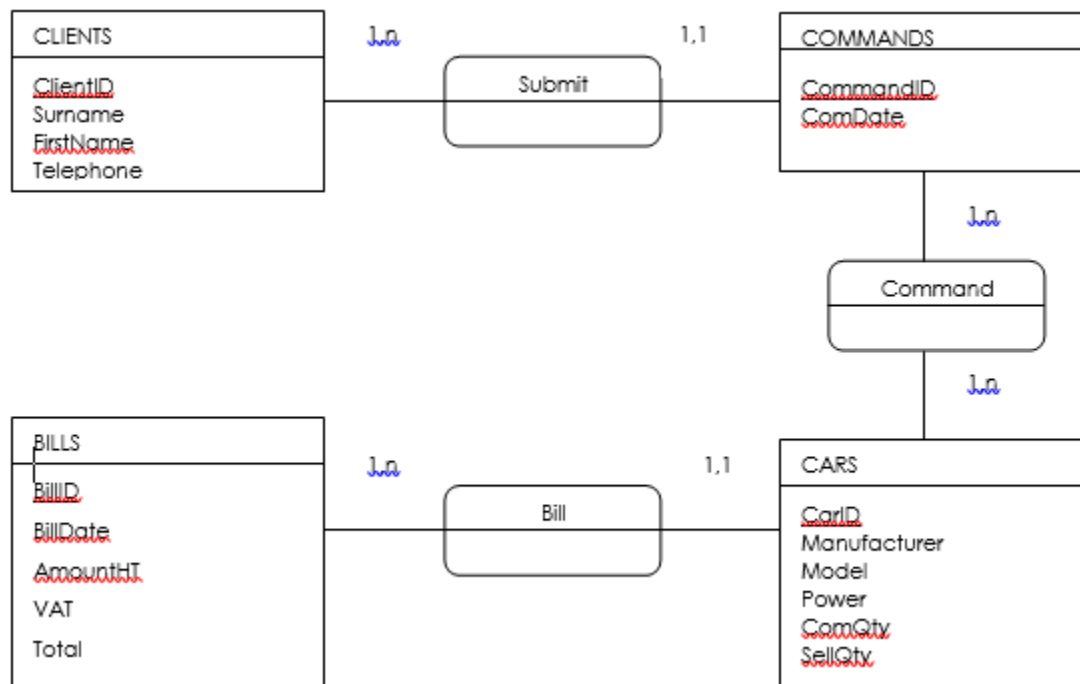
MARKING SCHEME

Identify all entities, attributes, name of relationship between entities and their cardinalities among them.

Entities: **1mark**

> ➢ CLIENTS
> ➢ BILLS
> ➢ CARS
> ➢ COMMANDS

ATTRIBUTES OF CLIENTS: **2marks**

> ➢ ClientID PRIMARY KEY
> ➢ Surname
> ➢ FirstName
> ➢ Telephone

ATTRIBUTES OF COMMANDS **1mark**

> ➢ CommandID primary key
> ➢ Command date(comdate)

ATTRIBUTES OF BILLS **1mark**

> ➢ BillID primary key
> ➢ Bill date
> ➢ AmountHT
> ➢ VAT
> ➢ Total

ATTRIBUTES OF CARS **2marks**

> ➢ CarID primary key
> ➢ Manufacturer
> ➢ Model
> ➢ Power
> ➢ Comqty(commodity quantity)
> ➢ Sell qty.

Relationship name between 2 entities (CLIENTS, COMMANDS) is Submit.**0.5mark**

Relationship name between 2 entities (COMMANDS, CARS) is Command.**0.5mark**

Relationship name between 2 entities (BILLS, CARS) is   Bill **0.5mark**

Cardinality between 2 entities (CLIENTS, COMMANDS) are: 1:1,1:M **0.5mark**

Cardinality between 2 entities (COMMANDS, CARS) are: 1:1, M:M **0.5mark**

Cardinality between 2 entities (BILLS, CARS) are: 1:1, M:1 **0.5mark**

LMD **5 marks(each carry out 1mark)**

CLIENTS (ClientID, Surname, FirstName, Telephone)
COMMANDS (CommandID, ComDate, ClientID#)
COMMAND (CommandID, CardID)
CARS (CardID, Manufacturer, Model, Power, ComQty, SellQty, Price, BillID#)
BILLS (BillID, BillDate, AmountHT, VAT, Total)

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.1: Design an entity relationship diagram (ERD).

Q17. a. Define metadata

b. List 4 types of metadata

c. Explain types of metadata listed in (b)

MARKING SCHEME

Metadata is data or information that provides information about other data. Metadata is data about data. we can say that Metadata is the summarized data for the contextual data. **2marks**

b. Types of metadata 2marks (each carry out 0.5mark)
  ➢ Technical Metadata
  ➢ Business Metadata
  ➢ Operational Metadata

➢ Descriptive Metadata

C. Explain types of metadata listed in (b) **(each carry out 1.5marks)**

➢ Technical Metadata: This type of metadata defines database system names, tables names, table size, data types, values, and attributes. Further technical metadata also includes some constraints such as foreign key, primary key, and indices.

➢ Business Metadata: It consists of the ownership of data, changing policies, business rules and regulations, and other business details. This type of metadata is related to a particular business.

➢ Operational Metadata: This type includes the data which is currently under any operation. Besides, it represents the data that is used by executive-level managers to perform any task. Also, this type of metadata can be purged, archived, or activated and can also be migrated.

➢ Descriptive Metadata: Descriptive metadata describes any file, folder, book, image, or video. It may include details of data such as title, author, date, size, author name, published on, and similarly others.

References: SFDSFD401, BASICS AND FUNDAMENTALS OF DATABASE learning unit 2: Design database, Learning Outcome 2.1: Design an entity relationship diagram (ERD).