061306T4CPM

COMPUTER PROGRAMMING LEVEL 6

IT/OS/CP/CR/04/6/A

DEMONSTRATE DATABASE DESIGN AND DEVELOPMENT

NOV / DEC 2023

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

WRITTEN ASSESSMENT

TIME: 3 Hours

INSTRUCTIONS TO CANDIDATE:

1. *The paper consists of **two** sections: **A** and **B***
2. *Answer **ALL** questions in Section **A** and any **Three** from section **B***
3. *Marks for each question are indicated in the brackets*
4. *A separate answer booklet will be provided*
5. *Do not write on the question paper*

Candidates should answer the questions in English

This paper consists of 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)

(Answer ALL questions in this section)

1) List TWO advantages of using database systems (2 Marks)

2) Explain TWO components of a relational database (4 Marks)

3) Differentiate between COUNT DISTINCT and COUNT (*) as used in Structured Query language (2 Marks)

4) List FOUR characteristics of a primary key in a database (4 Marks)

5) Explain each of the following approaches used in the design of a database

   (i) Top Down

   (ii) Bottom Up (4 Marks)

6) Differentiate between TRUNCATE and DROP commands as used in SQL (4 Marks)

7) List FOUR functions of views as used in Structured Query Language (4 Marks)

8) State FOUR anomalies eliminated by normalization (4 Marks)

9) Explain a relational database management system (2 Marks)

10) Distinguish between CASCADE and RESTRICT commands as used in database view (4 Marks)

11) The following are SQL statements. Use them to identify the errors in the statements (6 Marks)

```
Create Table (Staffno varchar (5), lname (varchar (15), salary
decimal ((7,2);
INSERT TO STAFF('ST678','Lenny',"15700");
SELECT staffno, lastname, salary
From staff
Where salary > 10000;
```

SECTION B: (60 Marks)

(Answer any THREE questions in this section)

12. a) Explain each of the following terms as used in database (4 Marks)

i. Table

ii. View

b) Table 1 shows a database named hostelworkers. Use it to answer the question that follows (6 Marks)

ID	Name	HostelName	Age	Salary	YearsofService
20	Patrick	Nakuru	44	32000	7
21	Dolly	Elementatita	54	48000	15
45	Dennis	Nairobi	34	20000	5
46	Patricia	Eldoret	30	19000	3
47	Christine	Kisumu	38	20500	6
63	Lucy	Mombasa	43	45000	9
67	Susan	Nyeri	36	26000	7

Table 1

Write an SQL statement that would:

(i) Sort the hostel table by the name and salary in descending order

(ii) Find the average for all employees

(iii)Increase salary for all employees by 15%

c) Explain the term identity column as used in database (2 Marks)

d) A database designer is in the process of designing a database. Explain FOUR phases that she should consider during design (8 Marks)

13. a) With the aid of examples in each case, differentiate between Data Definition Language (DLL) and Data Manipulation Language (DML) (6 Marks)

b) Explain the function of each of the following SQL Statements (6 Marks)

(i) FROM

(ii) ORDER BY

(iii) HAVING

c) The following are tables created in a database. Use them to answer the questions that follow

Table A

ROLL_NO	NAME	ADDRESS	PHONE	AGE
1	HARSH	UGANDA	XXXXXXXXXX	18
2	PRATIK	KENYA	XXXXXXXXXX	19
3	RIYANKA	SUDAN	XXXXXXXXXX	20
4	DEEP	NIGERIA	XXXXXXXXXX	18
5	SAPTARHI	DRC	XXXXXXXXXX	19
6	DHANRAJ	EGYPT	XXXXXXXXXX	20
7	ROHIT	ZAMBIA	XXXXXXXXXX	18
8	NIRAJ	GHANA	XXXXXXXXXX	19

Table B

COURSE_ID	ROLL_NO
1	1
2	2
3	3
1	4
4	9
5	10
4	11

State the fields that would be generated when each of the following relational algebra operations are performed. (8 Marks)

i. Inner join A and B
ii. Right outer join A and B
iii. Left outer join A and B
iv. Full outer join A and B

14. a) Differentiate between the following cardinal relationships (6 Marks)

i. Many to One Relationship

ii. Many to many Relationship

iii. One to many Relationship

b) Study the scenario below:

A salesperson may manage many other salespeople. A salesperson is managed by only one salespeople. A salesperson can be an agent for many customers. A customer is managed by one salespeople. A customer can place many orders. An order can be placed by one customer. An order lists many inventory items. An inventory item may be listed on many orders. An inventory item is assembled from many parts. A part may be assembled into many inventory items. Many employees assemble an inventory item from many parts. A supplier supplies many parts. A part may be supplied by many suppliers. Draw an ER diagram to represent the narrative. (7 Marks)

c) A learning institution maintains details of its lecturers who are teaching various units as follows:

Lecturer No, Lecturer Name, grade, code, department name, subject code, subject name, subject level.

Each lecturer may teach many subjects but may not belong to more than one department. Normalize this data to 3rd Normal form. (7 Marks)

15 a) Table 2 shows the design of a table named *Asset.* Use it to answer the questions that follow.

Field	Description
Asset_ID	This number identifies the Asset. It is the Primary Key
Asset_Name	Identifies the name of the Asset. The field should not allow null values. Should hold not more than 20 characters.
Asset_Description	Gives a brief description of the function of the Asset. Should hold not more than 60 characters.
Year_of_Purchase	When the Asset was procured. The field should not allow null values

Table 2

Write and SQL statement that would

(i) Create the table (4 Marks)

(ii) Add the following column to the table Asset (2 Marks)

Field	Description
Asset_Category	This field holds the category the asset belongs to. Should not be null and hold more than 55 characters

(iii) Add the following values to the table (4 Marks)

Asset_ID	**Asset_Name**	**Asset_Description**	**Year_of_Purchase**	**Asset_Category**
10	Mouse	A mouse is a device used as an accessory in a computer	2017	Computer accessory

b) State FOUR differences between primary key and foreign key as used in database (4 Marks)

c) Discuss the following database models (6 Marks)

i. Relational Model

ii. Hierarchical model

iii. Network model

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