TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

ADVANCED CERTIFICATE IN COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2023

SUBJECT: DATABASE TECHNOLOGY

TIME ALLOWED: 3 HOURS

TOTAL MARKS: 100
PASS MARK: 50

INSTRUCTIONS

1. Write your examination number and National Registration Card number on the answer Booklet provided. Ensure to append your signature in the space provided on the answer booklet.
2. Write your answer **SCRIPT SERIAL NUMBER** on the examination register provided and the entry slip.
3. There are **SEVEN (7)** questions in this paper.
4. Attempt any **FIVE (5)** questions of your own choice.
5. All questions carry equal marks.
6. Cell phones and programmable calculators are **NOT** allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

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QUESTION 1

a) Define a traditional file-based system. (2 marks)

b) Explain the following limitation of a file based system:

i) Separation and Isolation of files (2 marks)

ii) Data dependence (2 marks)

iii) Incompatible file formats (2 marks)

c) State the function of each subsystem of the DBMS below:

i) Security system (3 marks)

ii) Integrity system (3 marks)

iii) Concurrency control system (3 marks)

iv) Recovery system (3 marks)

Total (20 Marks)

QUESTION 2

a) In DBMS, a data item can be described at **three (3)** distinct levels.
State **three (3)** different levels that can be used to describe data in DBMS.
(9 marks)

b) Describe **three (3)** types of schema found in a database. (9 marks)

c) Define a view in database. (2 marks)

Total (20 Marks)

QUESTION 3

a) Define a data model (2 marks)

b) Describe the components of a data model. (6 marks)

c) State **four (4)** typical functions of the DML. (4 marks)

d) Explain **four (4)** benefits of maintaining a system catalog in databases. (8 marks)

Total (20 Marks)

QUESTION 4

a) Explain the importance of foreign keys in RDBMS (4 marks)

b) In order to carry out the relational algebraic union operation, the relations involved must be union compatible.
Explain a situation where relations are union compatible. (4 marks)

c) State the meaning of the following when writing an SQL statement:

i) Upper case letters (2 marks)

ii) Lower case letters (2 marks

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iii) Vertical bar (|) (2 marks)
iv) Curly braces { } (2 marks)
v) Square braces [ ] (2 marks)
vi) Ellipsis ... (2 marks)

Total (20 Marks)

QUESTION 5

a) Using "City" as search attribute, write SQL statement with a pattern matching condition where the search word must start 'L' and contains 4 characters. (4 marks)

b) Outline the main activities carried out in the conceptual design phase of database design. (8 marks)

c) Explain the properties of a transaction. (8 marks)

Total (20 Marks)

QUESTION 6

Given the following requirements for a simple database for the National Football League (NFL)

- the NFL has many teams,
- each team has a name, a city, a coach, a captain, and a set of players,
- each player belongs to only one team,
- each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records,
- a team captain is also a player,
- a game is played between two teams (referred to as host team and guest team) and has a date (such as march 8th, 2022) and a score (such as 4 to 2).

a) State the entities and their attributes from the scenario above. (6 marks)

b) Using the cardinality mappings, construct a clean and concise ER diagram for the NFL database using the Chen notation. (12 marks)

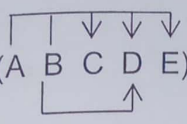
c) Explain recursive relation that may exist. (2 marks)

Total (20 Marks)

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QUESTION 7

a) Consider the relation R (A B C D E) with functional dependencies as shown.



i) Explain the reason the relation is not in the Second Normal Form. (4 marks)

ii) Transform the relation into the Second Normal Form. (4 marks)

b) CIA is a common acronym used in database security.

Explain the objective of each letter in relation to database security (6 marks)

c) Explain the meaning of a serializable schedule. (4 marks)

d) State the types of DDBMS (2 marks)

Total (20 Marks)

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