66.5-12-22

TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

CERTIFICATE IN ADVANCED COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

SITTING: NOVEMBER/DECEMBER 2022

SUBJECT: DATABASE TECHNOLOGY

TIME: THREE (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 choice
5. Each question carries twenty (20) 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

QUESTION 1

a) One of the disadvantages of file-based systems is ***data dependence.*** (4 marks)
Define the term 'dependence.' (6 marks)
b) Explain **two (2)** limitations of file-based systems (10 marks)
c) Outline the components of the DBMS **(Total: 20 marks)**

QUESTION 2

a) The main objective of the ANSI-SPARC three level architecture is to provide ***data independence.***
Discuss the term data independence is relation to the ANSI-SPARC architecture (8 marks)
(12 marks)
b) Outline **six (6)** functions of DBMS **(Total: 20 marks)**

QUESTION 3

a) Explain the following relational model terms: (2 marks)
(i) Domain (2 marks)
(ii) Cardinality (2 marks)
(iii) Candidate key (2 marks)
(iv) Base relation (2 marks)
(v) View
b) Using an example, distinguish between Unary and Set operations in relational algebra. (6 marks)
c) Explain views in relation to database security. (4 marks)
(Total: 20 marks)

QUESTION 4

a) As an employee, the organisation will not only need to keep your details but also of your spouse and dependents.
Explain the type of entity that will represent the dependents and the spouse. (4 marks)
b) Using a diagram, explain the ternary relationship. (4 marks)
c) Distinguish cardinality from participation constraints. (6 marks)
d) The initial step in database design is to build the conceptual data model.
Outline **six (6)** steps involved in the conceptual database design. (6 marks)
(Total: 20 marks)

QUESTION 5

a) Define a data warehouse (2 marks)
b) List **five (5)** functions of Distributed Database Management System (DDBMS).
c) Explain the atomicity and durability properties of a transaction (4 marks)
d) Explain the following problems that may result from lack of concurrency control
(i) Nonrepeatable read (3 marks)
(ii) Lost update (3 marks)
(iii) Inconsistent analysis (3 marks)
(5 marks)

(Total: 20 marks)

QUESTION 6

a) Outline the steps involved in data normalisation up to the Third Normal Form (3NF) (12 marks)

b) Explain the following SQL clauses in the SELECT statement
   (i) ORDER BY (4 marks)
   (ii) GROUP BY (4 marks)

(Total: 20 marks)

QUESTION 7

a) Define a deadlock in database systems. (2 marks)
b) Discuss **two (2)** techniques of handling deadlocks. (8 marks)
c) State the facilities that the DBMS must provide to assist with recovery of the database. (4 marks)
d) Using an illustration, explain functional dependencies. (6 marks)

(Total: 20 marks)