



Technical Education, Vocational and
Entrepreneurship Training Authority

CERTIFICATE OF ADVANCED IN COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

SESSION: NOVEMBER/DECEMBER 2020

SUBJECT: DATABASE TECHNOLOGY

TIME ALLOWED THREE (3) HOURS

TOTAL MARKS: 100

PASS MARK: 50

INSTRUCTIONS TO CANDIDATES:

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 entry slip.

3. There are seven (7) questions in this paper.

4. Answer any FIVE (5) questions.

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

Question 1

- a) You have been tasked to design a database for a given organisation. Describe the phases of database design that you will undertake. (15 Marks)
- b) Distinguish between DDL from DML. (5 marks)

[Total: 20 marks]**Question 2**

- a) Justify the decision to switch from file-based system to database system using the following terms.
- i) Program - Data dependence (2 marks)
 - ii) Fixed file formats (2 marks)
 - iii) Data inconsistency (2 Marks)
- b) Explain the entity and referential integrity rules of a relation. (10 Mark)
- c) Describe the atomicity and duration properties of a transaction. (4 Marks)

[Total: 20 Marks]**Question 3****Analyse the following requirements:**

PHILCOM is a limited company. In this company are four departments, a system should keep details of department name and department code, manager of each department and total number of employees in each department. Each employee belongs to one department only.

Employee's details such as name, employee number, salary, age and department assigned to must be kept. An employee may work on different projects and each project may be worked on by several employees but supervised by one. The system should keep details of each project such as project name and duration to keep track of it and manage it.

Instructions

- a) Design an ERD that includes multivalued, derived, and composite attributes. (16 Marks)
- b) Highlight participation and cardinality ratio constraints. (4 Marks)

[Total: 20 Marks]

Question 4

- a) Describe four (4) clauses of SELECT statement of DML. (12 Marks)
- b) Given a relation below:

EmployeeID	ENAME	SALARY	GENDER
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- i) Write an SQL that appends a tuple to the relation. (5 Marks)
- ii) Write an SQL to increase salaries of employees who earn less than 5000 by 30% of the salary. (3 Marks)

[Total: 20 marks]**Question 5**

- a) Define a system catalog (1 Mark)
- b) State three (3) contents of System Catalog. (3 Marks)
- c) State three (3) objectives of the three-level ANSI SPARC architecture. (3 Marks)
- d) Explain the view mechanism as a security feature of the database. (5 Marks)
- e) In relation to the description of the database at three levels, Explain the following, using typical examples:

- i) Physical data independence (4 Marks)
- ii) Logical data independence (4 Marks)

[Total: 20 Marks]**Question 6**

- a) Discuss the effects that maybe encountered when databases are not protected against compromises of their minimum standards. (12 Marks)
- b) The DBMS supports a number of users that run different transactions; Describe the term concurrency control. (2 Marks)
- c) Explain two (2) methods of concurrence control. (6 marks)

[Total: 20 marks]**Question 7**

- a) Define an expert system. (2 marks)
- b) Explain the following terms
- i) Commit point. (2 marks)
 - ii) Rollback. (2 marks)
 - iii) Redo. (2 marks)
 - iv) Undo. (2 marks)
 - v) Before image. (2 marks)
 - vi) After image. (2 Marks)
- c) Distinguish heterogeneous DBMS from homogeneous DBMS. (8 marks)

[Total: 20 Marks]