TEVETA

TECHNICAL EDUCATION VOCATIONAL AND ENTREPRENEURSHIP TRAINING AUTHORITY

ADVANCED CERTIFICATE IN COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

NOVEMBER/DECEMBER 2019

SUBJECT: DATABASE TECHNOLOGY

TIME ALLOWED 3 HOURS **TOTAL MARKS 100**

PASS MARK 50

INSTRUCTIONS TO CANDIDATES:

1. Write the examination number and the National Registration Card Number on the answer booklet provided
2. There are Seven (7) questions in this paper
3. Attempt any Five (5) questions of your choice
4. 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) Distinguish traditional file-based systems from database systems. (6 Marks)

(b) Explain the use of views in enforcing security in a database system. (4 Marks)

(c) Explain the following relational algebra operation

(i) Selection

(ii) Projection

(iii) Set difference

(iv) Cartesian products

(v) Union (2 Marks each)

[Total: 20 Marks]

QUESTION 2

(a) Explain the different levels found in the ANSI-SPARC three – level architecture and state why this type of layering is important in database design. (10 Marks)

(b) Distinguish database intention from a database extension. (4 Marks)

(c) State the four (4) operations that are usually supported Data Manipulation Language (DML). (4 Marks)

(d) Define a data model (2 Marks)

[Total: 20 Marks]

QUESTION 3

UPS is worldwide package Delivery Company. It prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterised by item number (unique), weight, dimensions, insurance amount, destination and final delivery date. Shipped items are received into the UPS system are received into the UPS system at a single retail centre.

Retail centres are characterized by their type, unique ID and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e. flight, truck delivery). These transportation events are characterised by a unique schedule number, a type (e.g. flight, truck), and a delivery route.

Create an entity relationship diagram that captures this information about the UPS system. Indicate identifier and cardinality constraint. (20 Marks)

[Total: 20 Marks]

QUESTION 4

(a) Concurrency control is one of the many functions of the DBMS. If not managed well, the data in the database may not be reliable and trustworthy.

Discuss the three (3) problems that lack of concurrency control can cause in a database. (12 Marks)

(b) Define a deadlock in a DBM. (2 Marks)

(c) Authorization is one of the techniques used to enforce security in DBMS. Differentiate authorization from authentication in database security. (6 Marks)

[Total: 20 Marks]

QUESTION 5

(a) Define an expert system (2 marks)

(b) State three (3) advantages of an expert system. (3 Marks)

(c) The database design process is made of three main phases: conceptual, logical and physical database design.

Describe the activities involved at each phase identified above. (15 Marks)

[Total: 20 Marks]

QUESTION 6

(a) Database recovery, transaction support and concurrency control are some of the functions of the DBMS

Describe the above DBMS functions stating the component of the DBMS that perform each function. (15 Marks)

(b) State the rules that applied at each stage of data normalisation up the 3NF (5 Marks)

[Total: 20 Marks]

QUESTION 7

(a) Define a distributed database (2 Marks)

(b) Distributed Database Management Systems can be homogeneous or heterogeneous

(i) Explain each type of DDBMS (8 Marks)

(ii) Discuss two (2) advantages of each (8 Marks)

(c) Explain the term functional dependency. (2 Marks)

[Total: 20 Marks]