CHUKA   **UNIVERSITY**

SUPPLEMENTARY / SPECIAL EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF BACHELOR DEGREE IN COMPUTER SCIENCE

COSC451: ADVANCED DATABASE SYSTEMS

STREAMS: Y4 S1

TIME: 2 HOURS

DAY/DATE: TUESDAY 17/11/2020   **11.30 A.M – 1.30 P.M.**

INSTRUCTIONS:
Question number 1 is compulsory. Answer any two questions from the rest.

SECTION A (30 MARKS)

QUESTION 1

a) Define the following terms as applied in database systems: (4 Marks)
   i.   Relational algebra

   ii.   Schema

   iii. Indexing

   iv.   Query processing

b) State four reasons why query optimization is important.   (4 Marks)

c) Differentiate between database and data warehouse.   (4 Marks)

d) Distinguish between data security and data integrity.   (4 Marks)

e) Explain the following joins as applied in relational algebra: (6 Marks)

   i.   Equijoin

   ii.   Inner Join

iii. Natural Join

f) Write the relational algebra version of the following SQL expression: (5 Marks)

Select regno, Surname OthernamesFrom studentWhere DOB> 20/3/1988

g) Explain encapsulation, inheritance and polymorphism as in object databases. (3 Marks)

Question 2

a) Differentiate between OLTP(online transaction processing) and data warehousing.(6 Marks)

b) Describe any four datamining techniques. (8Marks)

c) With the aid of a diagram, discuss the multi-dimensional data model of the data warehouse.
(6 Marks)

Question 3

a) Data warehousing comes with a number of benefits. Explain five of these benefits. (5 Marks)

b) Consider the following schema:

Suppliers (sid : integer, sname : string, address : string)
Parts (pid : integer, pname : string, color : string)
Catalog (sid : integer, pid : integer, cost : real)

i. The key fields are underlined and domain of each field is listed after the field name.
(2 Marks)

ii. Find the name of suppliers who supply some red parts. (2 Marks)

iii. Find the sids of suppliers who supply some red or green parts. (2 Marks)

iv. Find the sids of suppliers who supply some red part or are at 221 packer Ave.

(2 Marks)

v. Find the sids of suppliers who supply some red part and some green part.(2 Marks)

vi. Find the sids of suppliers who supply every part. (2 Marks)

vii. Find the sids of suppliers who supply every red part. (2 Marks)

viii. Find the sids of suppliers who supply every red or green part. (2 Marks)

Question 4

a) Explain any four types of complex applications that prompt the use of object databases instead of relational databases.   (8 Marks)

b) State and explain three goals and threats of database security.   (6 marks)

c) Explain the use of the following OLAP processes:

   (i) Drill-down   (2Marks)

   (ii) Consolidation   (2Marks)

   (iii) Slicing   (2Marks)

Question 5

c) State and explain two characteristic of distributed database management system (4 Marks)

d) With the aid of diagram describe the query optimizer architecture.   (8 Marks)

e) With aid of an example differentiate between clustered index and non-clustered indexing.

                                                                              (4 Marks)

f) With the help of a diagram, discuss the process of moving data from various sources into the data warehouse.   (4 Marks)

………………………………………………………………………………………………