OFFICE OF THE DVC
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2023 /2024 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

MAIN EXAMINATION

COURSE CODE: COM 318

COURSE TITLE: DATABASE SYSTEMS

DATE: 15/04/2024 TIME: 0900 – 1200HRS

INSTRUCTION TO CANDIDATES

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COM 318

MAIN EXAMINATION

Course Code---: Course Title-------COM 318 Database Systems----------

STREAM: BSc (Computer Science) DURATION: 3 Hours

INSTRUCTIONS TO CANDIDATES

i. *Answer **ALL** questions from section A and any **THREE** from section B.*
ii. *Maps and diagrams should be used whenever they serve to illustrate the answer.*
iii. *Do not write on the question paper.*

SECTION A (24 MARKS) COMPULSORY

Section A: Answer ALL Questions in this section

QUESTION ONE **(12 MARKS)**

a) What are the different types of database end users? Discuss the main activities of each. [2 Marks]
b) Discuss the differences between database systems and information retrieval systems. [2 Marks]
c) Explain drawbacks of using file systems to store data [2 Marks]
d) What is the most important difference between a disk and a tape? [2 Marks]
e) Name TWO components of a DBMS [2 Marks]
f) What is a DBMS catalogue? [2 Marks]

QUESTION TWO **(12 MARKS)**

a. Outline the term used to describe the capacity to change one schema without having to change other schemas or applications in a three-schema architecture. [2 Marks]
b. Describe the term candidate key [2 marks]
c. In what circumstances might it not be sensible to hold relational data according to these normal forms? [4 marks]
d. Define the notion of a functional dependency. [2 marks]
e. List the TWO cases where use of a NULL value would be appropriate. [2 marks]

Section B: Answer Any THREE Questions in this section

QUESTION THREE **(12 MARKS)**

a. What is a view as used in databases? [2 Marks]

b. Explain any **THREE** advantages of views in databases. [3 Marks]
c. Discuss the capabilities that should be provided by a DBMS. [3 Marks]
d. If you were designing a Web-based system to make bus reservations and sell bus tickets, which DBMS architecture would you choose from Section? Why? [4 Marks]

QUESTION FOUR **(12 MARKS)**

a. State why many to many relationships need to be resolved into one to many relationships in an ER model. [3 Marks]
b. A major objective of the ANSI-SPARC architecture is to provide data independence.

   i. Draw a diagram illustrating this architecture. [4 marks]

   ii. Using examples, discuss the concepts of logical data independence and physical data independence. [5 marks]

QUESTION FIVE **(12 MARKS)**

a. Discuss two of the problems associated with distributed database systems [4 marks]
b. Define the two main approaches to data security. [2 marks]
c. List and explain any four of Date's rules for distributed data base systems. [4 marks]
d. Briefly discuss any two data summarization technique. [2 marks]

QUESTION SIX **(12 MARKS)**

a. Independent Electoral and Boundaries Commission (Kenya's electoral body) records candidates' participation details in the table below.

VoteId is used to identify a particular candidate. Many candidates run for a given post in a given year. Many candidates can run for the same post in the same year. A candidate cannot run for the more than one post in a given year. Each staff member serves at a polling station only once.

VoteID	ElectionDate	ElectionYear	PollingStation	staffNo
V1	13-May-2013	2013	P1	S2
V2	13-May-2013	2013	P1	S2
V4	13-Sept- 2017	2017	P7	S4
V2	13- Sept -2017	2017	P8	S4
V1	13- Sept -2017	2017	P1	S5

i. Explain the term candidate key. [2 marks]

ii. List three candidate keys for the above. [3 marks]

b. Write an SQL statement for creating the tables above. Use appropriate data type for the attributes and add necessary constraints. [7 marks]

QUESTION SEVEN **(12 MARKS)**

a. Consider the school database, where the primary keys are underlined.

student (student_id, name, address,gender)
course (code, course_name, year)
department (dept_number, date, department_name)

i) Write an SQL statement to display all records in staff table [3 marks]

ii) Give an SQL statement to add a new record into the department table [5 marks]

iii) Write an SQL statement to delete all the records from the course table [3marks]

b. Define a Database [1 mark]