KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS, 2020/2021 ACADEMIC YEAR
FOURTH YEAR, FIRST SEMESTER EXAMINATIONS
FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

KCS 404 - ADVANCED DATABASE SYSTEMS

Date: 16th December, 2020
Time: 11.30am – 1.30pm

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS

a)   Describe the components of the database system.   (5 Marks)

b)   Outline any five functions of a database management system.   (5 Marks)

c)   Describe the phases of query processing in a DBMS.   (6 Marks)

d)   Explain the three main problems that concurrency control seeks to resolve.
                                                                                                                (6 Marks)

e)   Explain four types of data models available in the field of database modeling.
                                                                                                                (8 Marks)

 f)   Explain using a well labelled diagram the three-schema architecture of a database system.
                                                                                                                (10 Marks)

QUESTION TWO (20 MARKS)

a)   Describe the major characteristics of the database approach.
                                                                                                                (4 Marks)

b)   Discuss the three broad categories of the methods proposed to schedule the execution of conflicting operations in concurrent transactions.
                                                                                                                (6 Marks)

c)   Explain the Database Life Cycle in relation to database design from the perspective of project execution time and cost.
                                                                                                                (10 Marks)

QUESTION THREE (20 MARKS)

a)   Explain the need for normalization in databases.   (2 Marks)

b)   Given the following health history report:

PET-ID	PET-NAME	PET-TYPE	PET-AGE	OWNER	VISIT- DATE	PROCEDURE
456	MANNY	DOG	12	JAMES BARD	13-JAN-2020	01-RABIES VACCINATION
					20-FEB-2020	10-EXAMINE AND TREAT WOUND
					15-JUNE-2020	05-HEART WORM TEST
987	SPIKE	DOG	2	TREVOR NIGEL	21-JAN-2020	08-TETANUS VACCINATION
					16-APRIL-2020	05- HEART WORM TEST
239	BORRIS	CAT	4	KRIS DARCY	15-FEB-2020	01-RABIES VACCINATION
					16-MAY-2020	01-RABIES VACCINATION
672	SWEENEY	BIRD	2	ANNAH MARIE	20-JULY-2020	20-ANNUAL CHECK UP
					30-AUG-2020	12-EYE WASH

Design relation schemas for

   i)   1NF   (6 Marks)

   ii)   2NF   (6 Marks)
   iii)   3NF   (6 Marks)

QUESTION FOUR (20 MARKS)

a) Describe the major categories of data models.   (5 Marks)

b) Explain how you would implement locking mechanisms to enforce concurrency control
                                                                                                 (5 Marks)
c) Explain five properties of a transaction.   (10 Marks)

QUESTION FIVE (20 MARKS)

a) Describe the building blocks of a data model.   (4 Marks)

b) Describe the parts of an SQL-based relational database application.   (6 Marks)

c) Explain the two major techniques used in database recovery.   (10 Marks)