TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES/

COMPUTING AND INFORMATICS

SCHOOL OF BUSINESS MANAGEMENT SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION

TECHNOLOGY/ MATHEMATICS & PHYSICS / BUSINESS

ADMINISTRATION

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSIT)/

BACHELOR OF TECHNOLOGY IN INFORMATION

TECHNOLOGY(BTIT)/ BACHELOR OF MATHEMATICS AND

COMPUTER SCIENCE(BMCS)/ BACHELOR OF STASTISTICS AND

COMPUTER SCIENCE(BSSC)/ BACHELOR OF BUSINESS AND

INFORMATION TECHNOLOGY (BBIT)

EIT 4205/ ICS 2206 : DATABASE SYSTEMS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2HOURS

DATE: Pick Date.Sep 2018

Instructions to Candidates
You should have the following for this examination
-*Answer Booklet, examination pass and student ID*
This paper consists of **FIVE** questions. Attemptquestion ONE (Compulsory) and any other TWO questions.
Do not write on the question paper.

Question ONE

a. List any two types of database end users   (2 Marks)

b. Explain any two characteristics of database approach   (4 marks)

c. Distinguish between:

   i.   logical data independence and physical data independence
   ii.   Attribute and Value set
  iii.   Relationship instance and Relationship type   (6 Marks)

d. Write the SQL code that will create the table structure for a table named EMPLOYEE . Given the Attribute (field name) Data declaration as follows:

EMP_NUM CHAR(3)
EMP_FNAME VARCHAR(15)
EMP_LNAME VARCHAR(15)
EMP_GENDER CHAR(1)
EMP_HIREDATE DATE
JOB_CODE CHAR(3)

Write the SQL code to:

   i.   Create a table with appropriate primary key   (2 Marks)
   ii.   Insert any two records of your own into the table   (2 Marks)
  iii.   Change the structure of the above EMPLOYEE table by creating a new field
              “EMP_MNAME”   (2 Marks)

e. Highlight any five application areas of database systems   (5 Marks)

f. Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):

- The NHL has many teams,
- Each team has a name, a city, a coach, a captain, and a set of players,
- Each player belongs to only one team,
- Each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records, · a team captain is also a player,
- A game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2016) and a score (such as 4 to 2)

Construct a clean and concise ER diagram for the NHL database. Clearly indicate the cardinality mappings as well as any role indicators in your ER diagram. (7 Marks)

Question TWO

a. Explain why requirements collection and analysis is important during the process of database design. (4 Marks)

b. Outline briefly any four roles of database administrator (DBA) (4 Marks)

c. Explain any three advantages of views (6 Marks)

d. Use the ITEMS table shown below to write SQL statements for the following situation

PRODUCT	TOWN	CLIENT	UNITS
UNGA	KITALE	40	250
MAIZE	NAKURU	80	400
MILLET	GILGIL	60	250
CHAIR	MOMBASA	70	400
RICE	KITALE	35	600

   i.   Determine the number of clients in the town of kitale
   ii.   Calculate the average of the product units
   iii. Finding the product of all products whose units equal to the product designated by CHAIR (6 Marks)

Question THREE

a. How does multiplicity represent both the cardinality and the participation constraints on a relationship? (4 Marks)

b. Highlight any four benefits of a system catalog (4 Marks)

c. Briefly describe the stages of the database system development lifecycle. (6 Marks)

d. The PRODUCT table below shows details of products in an inventory system

Prodnum	Prodname	Quantity	Unit_price	Supplier_ name	Supply_date
3245	Processing unit	40	25000	ABC computers	8/09/16
7643	Monitor	60	12000	ABC computers	7/10/10

2190	Keyboard	200	600	Umoja solution	12/10/10
4372	Mouse	400	300	IT comm	3/09/10
8733	Hard disk	60	2400	IT comm	16/10/10
6754	Modem	120	1500	ABC computers	5/09/10

Write SQL statements that will:
  i.   List all products details starting with letter M.   (1 Mark)
  ii. Extract all the details of items products bought in ABC computers   (1 Mark)
  iii. Group all records by supplier_name.   (1 Mark)
  iv. Delete the item whose product number is 4372 from the table   (1 Mark)
  v.   The price for processing unit has increased by 5% update the relation to reflect
       this increase.   (1 Mark)
  vi. Remove the table from the database   (1 Mark)

Question FOUR

a. Describe the concept of transitive dependency. Explain how this concept is used to

 define 3 NF.   (4 Marks)

b. Give any two factors to consider when selecting a database management system product.

                                                                                                   (4 Marks)

c. Differentiate between the following SQL joins

  i.   Left and right outer join
  ii. Inner join and full joint   (4 Marks)

d. Consider the following relations developed for Mombasa Institute

Table: STUDENT

Student id	Names	Address	Town
S001	Sil John	4374	Mombasa
S002	John Jared	2135	Nairobi
S003	Janet Jared	4949	Eldoret
S004	Dominic Moses	3001	Kisumu

S005	Daniel Dorcas	4156	Mombasa
S006	Louise Ruth	8976	Kisumu
S007	Paula Sam	1033	Kakamega
S008	Scip Philip	4156	Kilifi
S009	Chris Daniels	7661	Mombasa

Table: EXAMINATION

Exam id	Student id	Center	Course	Result	Grade
E001	S005	RCC	Bsc. IT	Pass	B
E002	S003	JMC	Bcom	Pass	C
E003	S001	RCC	BE	Fail	E
E004	S006	JMC	BA	Pass	A
E005	S007	LC	BA	Pass	C

Write SQL statements to perform the following:

i.   List the student id, Name, center and result for all students who sat for exam.   (2 Marks)
ii. List all details of students in Mombasa institute including all who did not sit
     for the exam.   (2 Marks)
iii. List all students from the RCC center who have passed.   (2 Marks)
iv. The Exam center for S007 was Supposed to be RCC Modify EXAMINATION
     Table to reflect this state.   (2 Marks)

Question FIVE

a. Give a description of the following normal forms

i.   2NF
ii. 3NF   (2 Marks)

b. Briefly explain the two categories of SQL commands giving two examples of SQL
statements used in each category.   (6 Marks)

c. Using an example distinguish between the following attributes:

i.   Composite and Simple attributes
ii. Single-Valued and Multi-Valued attributes
iii. Stored, coded, or derived Attributes   (6 Marks)

d. Discuss any three database models in relational database system   (6 Marks)