KABARAK   **UNIVERSITY**

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COURSE CODE: COMP 314

COURSE TITLE: DATA BASE MANAGEMENT SYSTEMS

STREAM: Y3S1

DAY: TUESDAY

TIME: 9.00 – 11.00 A.M.

DATE: 24/03/2009

INSTRUCTIONS:

1. This question paper has FIVE questions
2. Answer question ONE and any other TWO questions

PLEASE TURN OVER

QUESTION ONE (30 MARKS) COMPULSORY

   (a) What is meant by the following terms

      (i)   Foreign key

      (ii)   Schema

      (iii)   Prototyping

      (iv)   Composite attribute   (8mks)

   (b) Distinguish between data security and data integrity   (2mks)

   (c) Explain four advantages of using relational database over flat file systems   (4mks)

   (d) Two business partners Abigail and Joel withdrew different amount of money at different branches of the same bank account concurrently. Illustrate and explain the concepts of lost updates, uncommitted data and inconsistent analysis problem that occurred as a result of the concurrency.   (6mks)

   (e) With the aid of a diagram, explain many to many relationships and describe how it can be resolved   (5mks)

   (f) What is the relational algebra version of the following SQL expression

```
Select regno, Surname Othernames
From student
Where DOB>'20/3/1988'
```
                                                         (5mks)

QUESTION TWO (20 MARKS) ELECTIVE

   (a) What is the distinction between data mining and data warehousing?   (2mks)

   (b) Differentiate between OLTP(online transaction processing) and data warehousing
                                                          (5mks)

   (c) Data warehousing comes with a number of benefits. Explain two of these benefits
                                                          (4mks)

   (d) Describe any three data mining techniques   (9mks)

QUESTION THREE (20 MARKS) ELECTIVE

Below is a sample data for a student progress database

COURSE

CourseCode	Description	CF
COMP 312	Networks	3.0
COMP 314	Databases	3.0
BIB 220	Religion	2.0

STUDENT

RegNo	Surname	OtherNames	Gender	DOB	DOA	ProgCode
65001	Kami	Rosemary	F	2/28/1988	5/13/2007	BSc
65003	Maina	Emmanuel Tum	M	6/3/1987	5/13/2007	BSc
65004	Ali	Henry	M	3/17/1988	5/13/2007	BMIT

COURSESTUDIED

RegNo	CourseCode	Cat	Exam
65001	COMP 314	20	40
65001	COMP 312	15	20
65001	BIB 220	23	25
65003	COMP 314	30	30
65003	COMP 312	18	30

Using the information given above, write SQL statements that

   (a) Creates STUDENT table using appropriate data types and corresponding data type lengths and includes the following constraints; RegNo is the primary key, ProgCode is a foreign key from a PRORAMME table, the gender field is F or M and DOB must be before today   (10mks)

   (b) displays a virtual field **Total** that adds cat and exam marks in the COURSESTUDIED table   (2mks)

   (c) lists STUDENTs **RegNo** and **Surname** for BMIT students   (2mks)

   (d) lists STUDENTs **RegNo** and **Surname** for BSc students in ascending order

                                                                 (3mks)

(e) lists STUDENTs **RegNo** and **Surname** for students who scored less than 20 in their

cat mark   (3mks)

QUESTION FOUR (20 MARKS) ELECTIVE

(a) The data below gives the attributes contained in text books purchase form

PurchaseOrderNo.

PurchaseDate

PublisherCode

PublisherName

   ISBN

   BookTitle

   AuthorCode

   AuthorName

   Quantity

Normalize the data to Third Normal Form showing all the steps taken.   (10mks)

(b) The six relations below are all in Third Normal Form and have been produced by normalization. Construct a Third Normal Form ER(entity-relationship) model from these relations. Do not show optionality or include relationship names.   (10mks)

PROGRAMME	PROGRAMME CONTENT	COURSE
ProgCode	ProgCode	CourseCode
ProgDescription	CourseCode	CourseTitle
		*LectureId
		*RoomNo.

LECTURER	ROOM	BUILDING
LecturerId	RoomNo.	BuildingCode
LecturerName	RoomCapacity	BuildingName
Tel.No.	*BuildingCode	

QUESTION FIVE (20 MARKS) ELECTIVE

    (a) Model the following scenario using Entity Relationship modeling showing cardinalities and relationships. Entities are capitalized.   (10mks)

```
There must be at least one BOOK COPY of each BOOK TITLE in a
library system.  Each BOOK TITLE must belong to one particular
CATEGORY, but a CATEGORY can exist in the system only if they
are current (i.e. if the book is returned, a record of the
loan is removed).  A BORROWER can have several LOANs (or none
at all) and each LOAN is for one BOOK COPY
```

    (b) Transform the following ER diagram into a relational model   (10mks)