UGANDA MARTYRS UNIVERSITY

UNIVERSITY EXAMINATIONS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS

END OF SEMESTER FINAL ASSESMENT

SEMESTER 2, 2024

COURSE	:	**BACHELOR OF INFORMATION TECHNOLOGY**
PAPER	:	**BSIT62203 DATABASE PROGRAMMING**
YEAR OF STUDY	:	**YEAR TWO**
SEMESTER	:	**TWO**
DATE	:	**Tuesday14th MAY 2024**
DURATION	:	**3 HOURS (2:00pm to 5:00 pm)**

Instructions

1. This exam comprises of seven questions. Attempt any **Four questions** in this exam.
3. Use of relevant Illustrations/diagrams will earn you a bonus mark (s)
4. Remember to indicate the question number you have answered.
5. Write your registration number on all your answer sheets
6. All answers should be written on the answer booklet
7. All university rules apply

Question 1: (25 marks)

a) With clear examples, distinguish between the following terms; **(9 Marks)**

i. Binary Relationship from Tertiary Relationship

ii. Entity Integrity from Referential Integrity

iii. Simple Attribute from Composite Attribute

b) Efficient health care is one of the vital services that patients need to have access to. The proposed database application will be used to manage patient's records and the prescription details given to the patients by a relevant hospital staff member. You have been contracted as a logical database developer to model this database. Think of any other database business processes that will be made use of at this hospital.

a) Briefly explain and state the proposed business processes; from the proposed database business processes clearly state the relationship between the different entities, specify the bi-directional multiplicities between the different relationships. **(6 marks)**

b) Transform the proposed business processes identified in (i) into an Entity relationship diagram. Your ERD should have a minimum of 6 tables, primary and foreign keys should be clearly indicated, numeric multiplicities should be. Use Crows Foot Notation **(10 marks)**

Question 2: (25 marks)

a) Briefly explain the relevance of enhanced entity relationship model (EERM) as used in database design. **(3 marks)**

b) Uganda Martyrs University has a wide range person(s) that access different services. A person seeking a service could be an employee, an alumnus or a student. Employees in this organization can be of different categories. The employee can be a Teaching Staff and a Support Staff. A Student can be a Graduate student or an undergraduate student or a student Assistant but

cannot be in the same category. Based on the above case, make use of Enhanced Entity Relationship Diagram (EERD) to represent the following concepts:

i) Specialization. **(3 marks)**

ii) Generalization. **(3 marks)**

iii) Overlapping and Disjoint relationship. **(4 marks)**

c) Transaction Management is paramount while dealing with database management systems. With examples, briefly explain the ACID properties as used in transaction management. **(12 marks)**

Question 3: (25 marks)

i) Data types are said to be essential when creating relations in databases. With two reasons, Justify this claim? ***(4 marks)***

ii) Briefly explain the functionality of any three types of database constraints implemented in DBMS to better the functionality in databases. ***(6 marks)***

Considering the "**TEAM**" structure above, Write **SQL STATEMENTS** to answer the questions below;

Name	Null	Key
PassportNo	No	PRI
Name	No	NOT NULL
DOB	Yes	
MobileNo	Yes	UNIQUE

iii. Display the above structure. ***(2 marks)***

i. Create the **TEAM** table with all the appropriate data types. ***(3 marks)***

ii. Write a query that displays all the details from the table. **Note**: Name(s) should be in chronological order. ***(3 marks)***

iii. Change the MobileNo column to accommodate a maximum of 30 characters. ***(3 marks)***

iv. Insert a new column called **POSITION** in the table ***(2 marks)***

v. Eliminate all the rows in the table, while retaining the table structure. ***(2 marks)***

Question 4

Every variable in PL/SQL has a specific type associated with it. The type defines or specifies the kind of information the variable can hold. In PL/SQL variables could be created or declared in various ways.

a) State any four types which could be used in the declaration of variables and use each type to give an example of a variable declaration. **(8 Marks)**

b) PL/SQL allows us to create or declare variables basing on an existing variable or a column of an existing table. With examples explain how a variable could be created using:

i)the data type of an existing variable **(3Marks)**

ii) a column of an existing table. **(3Marks)**

c)Write a PL/SQL program of your choice which demonstrates the declarations explained in part (b) of this question. **(6 marks)**

d) PL/SQL stands for Procedural Language SQL. PL/SQL extends SQL by adding constructs found in procedural languages such as c++, Java, Php. With Clear examples write about any one construct PL/SQL adds to SQL. **(5 marks)**

Question 5: *(25 marks)*

5) Database stores data of various degrees, because of this there is need for data protection. Write SQL commands that will accomplish the concerns below.

a) You are required to produce a report showing the names of all database user accounts and their respective table spaces. Write an SQL statement to enable this operation. ***(3 marks)***

b) User account DENT was created to be used by a new intern, to develop some basic objects in the database under the instruction of the dba. Unfortunately, whenever the intern logs in to carry out the slated tasks, error messages pop up. Explain each of these and how they can be solved; ORA-01031: insufficient privileges. **(3 marks)**

c) Assuming you have been appointed to the position of a database Administrator **Uganda Martyrs University (UMU) Using** SQL statement show how you would;

i. Create a user account for new staff **ABBY** and **JOHN** and give them chance to change their passwords on login. ***(4 marks)***

ii. After a week, ABBY comes to you saying she just can't remember her password! Write the command which would help solve ABBY problem. ***(3 marks)***

iii. Authorize JOHN to update entries of the **Sales** relation in the UMU schema. ***(3 marks)***

iv. UMU has the following categories of employees; data_entrants, administrators, and accountants. Administrators create the database objects and can manipulate them. The data_entrants only enter data in the database tables and update entries but do not delete anything. Accountants make entries on the accounts table and can update these entries. Write the SQL statements you would need to;

a. Create roles for these categories of employees. ***(3 marks)***

b. Assuming ABBY is a data_entrant and JOHN is an administrator, assign each of them the role that suits their position. ***(6 marks)***

Question 6: (25 marks) -

Constraints are used in databases to ensure garbage in not entered in the system. Assuming the entity employee is already created. Write SQL statements that will append the following CONSTRAINTS as applied to the Employee structure below. **NB:**

Attribute	**Constraint**
Empno	Primary Key
Fname	Check
Lname	Not Null
Deptno	Check
DOJ	Default
Telephone_No	Null
Gender	Not Null
Salary	Not Null

i. Not all employees have telephones. Accept entries without a telephone number. (2 marks)

ii. The Lname column is a required field. (2 marks)

iii. The Telephone_No should at every entry have 12 numbers. (3 marks)

iv. The column Deptno , must start with a letter *D*. (3 marks)

v. The acceptable" Deptno" values are; D001,D003 and D002. (3 marks)

vi. The DOJ value should be the system date (3 marks)

vii. The Fname must be in Upper Case. (3 marks)

viii. The Empno column must start with "XYZ/" and it is a entity identifier. (3 marks)

ix. Deptno is a foreign key relating to a Deptno in DEPT table. (3 marks)

Question 7 (25 marks)

a) The basic unit in any PL/SQL program is a block. All PL/SQL programs are composed of blocks, which can occur sequentially (one after the other) or nested one inside another. Give and explain the purpose of each section of the PL/SQL block. (5 Marks)

b) PL/SQL Like other third generation languages has a variety of control structures that allow you to control the behavior of the block as it runs. These structures include the conditional statements and the loops. Its these control structures combined with variables that give PL/SQL its power and flexibility.

i) A student a Uganda Martyrs is allowed to do course work tests if he/she has **paid half or more than half of the fees.** Given that the total fees is **10000** . Write a PL/SQL program which picks the amount of money paid by Mark from the database table **umufees** and saves it into a variable and determines whether Mark should **do course** work tests or **not.**

REGNO	NAME	AMOUNTPAID	BALANCE
S01	Moses	5000	5000
S02	Joseph	4000	6000
S03	Mark	3000	7000
S04	Rose	2000	8000

(10 Marks)

ii) Usings a loop of your choice , write a PL/SQL program which prints all counting numbers between 40 and 70 (10 Marks)

End