

# UGANDA MARTYRS UNIVERSITY

UNIVERSITY EXAMINATIONS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEM

END OF SEMESTER FINAL ASSESMENT

SEMESTER 2, 2022/2023

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**COURSE** : BACHELOR OF SCIENCE IN INFORMATION  
TECHNOLOGY, COMPUTER SCIENCE, BSC EDUC & GEN

**PAPER** : DATABASE PROGRAMMING

**CODE** : CSC 2202

**CLASS** : TWO

**SEMESTER** : TWO

**DATE** : 19<sup>TH</sup> MAY 2023

**DURATION** : 3 HOURS

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## Instructions

1. **SECTION A is Compulsory. ( 40 marks)**
  2. **Attempt any two questions in Section B.**
  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 name, course and registration number on all your answer sheets**
  6. **All answers should be written on the answer booklet**
  7. **All university rules apply**
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## SECTION A (COMPULSORY)

### Question 1: (40 marks)

Uganda Martyrs University has a wide range of programmes/ Courses that students can be able to enroll. When a student enrolls at UMU, the student is expected to study by taking on a number of course units per semester. Lectures assess students in the different course units offered and a record of the different scores of the course unit is made to help in determining the class of degree the student has attained. The enrolled students are entitled to a wide range of university services like; health, library and accommodation. You have been contracted by the university to design/model a database that will keep track of the students' progress academically and the different services a student is entitled to.

Consider the information given as you respond to the following requirements.

- i. Before drawing the ERD, clearly state different bi-directional rules that will be made use of to generate the different relationship between the different entities. Ensure to clearly include the multiplicities in the bi-directional rules stated in the entity relationships. **(10 Marks)**
- ii. Develop an ERD model for the case given. Clearly show the entity and referential integrity between the different relations. **(15 marks)**
- iii. Basing on the above case, write SQL statements to perform the following tasks.
  - i. Create the database with a meaningful name. **(2 mark)**
  - ii. Create any two table in the above database specifying at least two applicable constraints. **(6marks)**
- iv. What architecture would best apply in the implementation of the proposed database and why? **(4 marks)**

**SECTION B: (ATTEMPT ANY TWO QUESTIONS FROM SECTION B**

**Question 2: (30 marks)**

Write SQL statements to enforce the following CONSTRAINTS as applied to the Employee table below. **NB:** Assume the entity Employee is already created.

Table Name: Employee

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

- i. The Lname column is a required field. ( 3 marks)
- ii. The Telephone\_No should have 9 numbers/values at every entry . ( 3 marks)
- iii. The column Deptno , must start with a letter D. ( 3 marks)
- iv. The acceptable "Deptno" values should either be ; D001 or D003 or D002. ( 3 marks)
- v. The DOJ value should be the system date ( 3 marks)
- vi. The Fname must be in Upper Case. ( 3 marks)
- vii. The Gender must have either 'M' or 'F'. ( 3marks)
- 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)
- x. Not all employees have telephones. Accept entries without a telephone number. (3 marks)



Question 3: (30 marks)

The HOSPITAL database contains Patient and Doctor tables as shown below. Use them to formulate **SQL STATEMENTS** that will help achieve the requirements that follow;

**PATIENT**

PName	P_ID	Amount	DOB	DID	Residence
Timothy	P001	10000	9-may-1990	D001	Kampala
Mark	P002	15000	8-sept-2000	D002	Nkozi
Gloria	P003	20000	23-aug-1998	D003	Kampala
Jacinta	P004	130000	12-apr-1994		Entebbe

**DOCTOR**

Doc_Name	Doc_ID	Specialty
Mathew	D001	Surgeon
Mary	D002	Optician
Regi	D003	Urologist
Amanda	D005	Surgeon

- Eliminate the DOB field from the patient table. ( 2 marks)
- Retrieve the last two attributes and last two rows from the doctor entity. ( 2 marks)
- Add another column to the Patient entity, the column name should be Gender . (2 marks)
- Nkozi patients were given a discount of 12%. Modify the above records. ( 3 marks)
- Use a database function to retrieve the highest amount paid by a patient from Kampala. ( 3 marks)
- Write a statement that makes use of the IN key word in your condition. ( 3 marks)

- vii. Retrieve the details of patients and the doctors who attended to them. ( 3 marks)
- viii. Display details of the patients charged the least amount. Assuming the amount is not known. (3marks)
- ix. Formulate a view of your choice from the patient relation. (3 marks)
- x. Enforce the referential integrity on the above table. ( 3 marks)
- xi. Formulate a left outer join from the above two entities ( 3 marks)

**Question 4: (30 marks)**

- a. Database security is key in ensuring trust of users. Explain four security mechanisms that can be employed to ensure optimum security of a database system.(6 marks)
- b. Database administrators assign privileges to control the activities of database users. Explain 2 types of privileges and give examples for each. (4 marks)
- c. MTN - Uganda has a number of users that have access to a shared database. You have been contracted as a database administrator to manage the database. Using SQL statement show how you would;
  - i. Create a user account for two new member of staff (Peter and Mary) and give them chance to change their passwords on login. (3 marks)
  - ii. Enforce system privileges on both account created above. ( 3 marks)
  - iii. Assume one of the tables created by Peter is the staff\_welfare table. Permit Mary to view and add records in that table. ( 3 marks)
  - iv. In the recent meeting, the board decided that Mary should no longer add records to the staff\_welfare table to avoid anomalies. Write a statement to implement this decision. ( 3 marks)

- v. Assume one of the staff has been granted maternity leave of three months and you do not want to her account to remain active in her absence. Write a statement that will handle this. ( 3 marks)
- vi. Peter is a manager and Mary is an office assistant. Create roles in this respect and give them the necessary privileges based on the job title. ( 5 marks)

End