Uganda Martyrs University

UNIVERSITY EXAMINATIONS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS

END OF SEMESTER FINAL ASSESSMENT

SEMESTER 1, 2023/2024

COURSE	:	**BACHELOR OF SCIENCE IN IT**
CLASS/YEAR	:	**THREE**
EXAM	:	**DATABASE PROGRAMMING**
CODE	:	CSC 2203
SEMESTER	:	**THREE**
DATE	:	**DEC 2023**
TIME	:	
DURATION	:	**3 HOURS**

INSTRUCTIONS

1. **ALL QUESTIONS CARRY EQUAL MARKS**
2. **ATTEMPT ONLY FIVE QUESTIONS**
3. **REMEMBER TO INDICATE THE QUESTION NUMBER YOU HAVE ANSWERED.**
4. **WRITE NAME, COURSE AND REGNO ON ALL YOUR ANSWER SHEETS**
5. **BEGIN EVERY QUESTION ON A NEW PAGE**
6. **ALL UNIVERSITY RULES APPLY**

CASE STUDY

Uganda Martyrs University library is a complex organization that manages a vast amount of data, including books, journals, articles, and other resources across all its campuses in the different regions of Africa. To effectively manage this data and provide efficient services to its users, the library requires a robust database system to solve challenges of data redundancy, data integrity, and poor data accessibility. Imagine you have been hired as lead expert in database programming for this application, answer the following questions.

QUESTION ONE

a) With examples suggest any three well explained types of databases [6 Mks]

b) Advise the development team on any six components of a database that need to be considered [6 Mks]

c) Briefly describe any four common database programming tasks that the UMU library development needs to know [8 Mks]

QUESTION TWO

a) Suggest any five well explained considerations (factors) that should guide the UMU library application development team in choosing the right DBMS [10 Mks]

b) Advise UMU library application development team on any five benefits that can be accrued as a result of using a DBMS [10 Mks]

QUESTION THREE

Using the table, help the UMU library application development team answer the answer the following questions.

Table 1: Book

Field	Data type	Size	Constraint
BookID	Int		Primary key
BookTitle	Varchar	15	Not null
Author	Varchar	25	Not null
Publisher	Varchar	25	Not null
Publishdate	date		Not null
Price	Decimal	(10, 2)	Not null
Genre	Char	10	Not null

Table 1: Customer

Field	Data type	Size	Constraint
CustomerID	Int		Primary key
CustomerName	Varchar	15	Not null
Address	Varchar	25	Not null

Publisher	Varchar	25	Not null
Publishdate	date		Not null
BookID	int		Not null
Gender	Char	6	Not null

1. Write SQL code that creates: (i) book table, (ii) customer Name [3 Mks]
2. Write SQL code that make BookID a foreign key in the customer table [2 Mks]
3. Write SQL code that adds a column BorrowDate between address and name with properties of date and not null [2 Mks]
4. Write SQL code that inserts data in four rows simultaneously at the same time(i) book table, (ii) customer Name [4 Mks]
5. Imagine a book with BookID '03' had its genre wrongly captured as 'Romance'. Write an SQL code to change genre to 'Flair and Relay' [2 Mks]
6. Write SQL code that Output all content of customer table with customer name arranged alphabetically from Z to A [2 Mks]
7. Using the inner join write SQL code to join the book table to the customer table [3 Mks]
8. Write SQL code that adds a column age for customer after customer name and check age to be above 18 [2 Mks]

QUESTION FOUR

a) Using examples of SQL code explain five types of aggregate functions that the UMU library applications development team should consider [10 Mks]

b) Apart from aggregate functions, with SQL code examples briefly describe any other three SQL functions that the UMU library applications development team can consider [6 Mks]

c) Briefly describe to the UMU library application development team the database CRUD operations as applied in database programming [4 Mks]

QUESTION FIVE

a) With support of a diagram as an illustration, brief describe the various transaction states in a DBMS that the UMU library application development team needs to know [10 Mks]

b) Briefly describe to the UMU library application development team two types of locks used in databases [4 Mks]

c) Briefly explain to the UMU library application development team the dirty read problem and lost update problem [6 Mks]

QUESTION SIX

a) Advise the UMU library application development team on any two differences between Serial Schedule and Serializable Schedule [6 Mks]

b) Briefly describe to the UMU library application development team the database ACID properties and how they work [10 Mks]

d) Given that two phase locking protocol works in two phases. Briefly discuss to the UMU library application development team these two phases [4 Mks]

QUESTION SEVEN

a) Using the case study above, derive an enhanced entity relationship model (EERD) that the UMU development could use [10 Mks].

b) Suggest three well explained different levels of database normalization that the UMU library development team can use [6 Mks]

c) Explain any components of Oracle Database that the UMU library development team need to know as they embark on implement an oracle-based application [4 Mks]

END

MERRY CHRISTMAS AND HAPPY NEW YEAR