

UGANDA MARTYRS UNIVERSITY
UNIVERSITY EXAMINATIONS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION
SYSTEM
END OF SEMESTER FINAL ASSESMENT
SEMESTER 2, 2024

COURSE : DIPLOMA/BACHELOR OF INFORMATION TECHNOLOGY

PAPER : DIT61202/BSIT 61203 DATABASE MANAGEMENT SYSTEMS

YEAR OF : YEAR ONE
STUDY

SEMESTER : TWO

DATE : TUESDAY 14TH MAY 2024

DURATION : 3 HOURS (9:30 AM -12:30 PM)

Instructions

1. **SECTION A is Compulsory. (25marks)**
 2. **Attempt any three 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 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 - (This is Compulsory)

Answer all the questions in this section by recording the correct option for each of the following multiple-choice questions. Each is 2 Marks

1. Which of the following is not an SQL data type?
a) varchar b) date c) int d) mysql
2. Which of the following is a database management system?
a) Mysql b) Python c) PHP d) Java
3. Which SQL Statement removes a row of data from a table?
a) alter table b) insert c) delete d) remove
4. Which of the following is a data manipulation SQL statement?
a) alter b) create c) update d) drop
5. Which of the following is an SQL aggregate function that returns or displays the number of values in a given column of a table?
a) sum b) count c) number d) total
6. Which SQL statement displays all the data in a given table?
a) show databases b) show tables c) select
7. Which of the following is true about names of databases, names of tables and names of columns?
a) names should be of any length in terms of characters.
b) names should have spaces in between
c) names should not start with digits
8. Which one of the following refers to the "data about data"?
a) Directory b) sub data c) ware house d) meta data
9. In the relational model, which of the following can also be represented by the term "attribute"?
a) Entity b) row c) column d) both b and c
10. Which of the following keys is generally used to uniquely identify a tuples with in a relation?
a) Primary keys b) Foreign Keys c) Secondary keys d) Non of the above
11. Which of the following SQL statements is a data definition SQL statement
a) create b) delete c) insert d) select
12. Which of the following statements removes a column from an existing table.
a) insert b) update c) remove d) alter

Section B- Answer any 3 questions from this section

Question 1: (25 marks)

a) With two reasons, briefly explain why data models are important before implementing a database (4 marks)

b) A newly established university named Dublin University is to be established and needs to design a database model that will boost the efficiency of operations at the university. The rules of the proposed model are as follows. This multi-specialty university that has a number departments. Students at this university enroll in one and only one programme and a programme can have a number of students. The students can be classified as under graduate and post graduate students. Students belong to particular department and a department can have 50 to numerous students. To attain different services at this university a student is expected to make payments. The payments can be done in one or multiple installments. But a given payment is effected by a particular student. This university has lecturers that can teach either one to five course units and a course unit is handled by either one or two lecturers. Records concerning students' assessments from the different course units are captured as well. The accommodation taken on by students are captured as well and any other functionalities that will ease the work of the employees and students at this university.

- i. Formulate any other additional business rules that may not have been specified and will lead to an efficient operational database. The rules should be bidirectional and should clearly specify the entities and multiplicities. (6 marks)
- ii. Transform the proposed business processes identified in the case into an entity relationship diagram. Your model should have a minimum of 7 tables, primary and foreign keys should be clearly indicated, multiplicities between the tables should be clearly indicated. (15marks)

Question 2: (25 marks)

The Board of Governors Centenary Bank would like to shift from a file-based approach to a database system

- a) Primary Key is a database are paramount! Briefly explain the steps / procedures one would go through to select an appropriate primary key from the pool of attributes of a given entity. **(4 marks)**
- b) Explain any 5 advantages associated with databases which the bank is likely to enjoy. **(10 marks)**
- c) Explain any five challenges associated with databases or database systems. **(5 marks)**
- d) A database can be accessed by multiple users! With an illustration, briefly explain any two most suitable multiple user database architecture which can be used to implement a database that would serve the required purpose. **(6 marks)**

Question 3: (25 marks)

- a) Differentiate the following terms as applied to DBMS; **(6 marks)**
 - i. Database from Database management system.
 - ii. Data from datatype
- b) The ANSI-SPARC model is said to help in explaining the various entry points to a database.

Required;

- i. Use a diagrammatic illustration to explain the ANSI-SPARC model. **(8marks)**
- ii. Basing on the ANSI-SPARC model, briefly explain the concept of user views in any database system. **(3marks)**
- iii. With basic illustrations, Discuss the following types of data independence and how they are achieved based on the ANSI- SPARC model. **(8marks)**
 - a. Physical data independence
 - b. Logical data independence

QUESTION 4. (25 marks)

With the help of the given information, respond to the following queries;

SUPPLIER DETAILS			
Supplier No.:	D10		
Supplier Name:	Dell		
Product No.	Product Name	Quantity	Unit Cost
P01	Computers	100 pieces	90,000
P02	Keyboard	5 pieces	8,000
Total Number of products: 2			

SUPPLIER DETAILS			
Supplier No.:	D12		
Supplier Name:	HP		
Product No.	Product Name	Quantity	Unit Cost
P03	Printer	5	40,000
P04	Network Switch	2	20,000
Total Number of products: 2			

- What is redundancy and how does normalization control it? **(3 marks)**
- Anomalies distort the normal functioning of a database. With a well formulated Illustration. Briefly distinguish between deletion from Insertion anomaly. **(4 marks)**
- Transform and represent the above information in an un-normalized form. **(4 marks)**
- Use the un-normalised relation above to explain the;
 - 1st normal form. **(4 marks)**
 - 2nd normal form. **(5 marks)**
 - 3rd normal form. **(5 marks)**

Question 5 (25 marks)

SQL is a language that users make use of to interact with a database. Write the SQL statements that will perform the following tasks.

- Create a database called UMU-DB **(2 marks)**
- Access and activate the database created above / move into the created database **(1 marks)**
- Create the following tables in the created database as described below;
(8 marks)

TABLE NAME: DOCTOR	
ATTRIBUTES	CONSTRAINT
DID	Primary key
FName	NOT NULL
LName	NOT NULL
Salary	
DeptNo	FK connecting the department table

TABLE NAME: DEPARTMENT	
ATTRIBUTES	CONSTRAINT
DeptNo	Primary key
Name	

- iv. Insert at least two records of your choice in the created table Doctor and department **(6 marks)**
- v. Retrieve the salaries of the doctors that are in the range of 40000 to 80000; **(2 marks)**
- vi. Increase all the salaries in the doctor table by 10% **(3 marks)**
- vii. Add a column called Section, to the Department table with an appropriate datatype. **(3 marks)**

Question 6 (25 marks)

Post Bank has released funds to develop a database application to store and manage all its customers data.

As a database designer you are requested to use MySQL to assist in the development of the database application by carefully coming up and recording only the SQL statements to accomplish the following tasks.

Apart from Question 1 which is 1 mark, each correct sql statement is 2 Marks.

1. Create a database with a suitable name. (1 Mark)
2. Create the following tables within the database with appropriate column names and data types.
 - a. Bankcustomers {accountno, Name, phoneno, age, address }
 - b. Accounts { accountno, bankbalance, accounttype}
 - c. Deposits {accountno ,amount, ddate}
 - d. Withdraw{accountno, amount}
3. Change the name of the table Bankcustomers to customers.
4. Remove the column address from the customers table.
5. Add a new column village to the customers table.
6. Add a new column wdate to the withdraw table.
7. Remove the primary key from the withdraw table.
8. Remove the column village from the customers table
9. Add a primary key made of accountno to the withdraw table.
10. Change the name of the column bankbalance to balance in the accounts table.

Question 7. (25 Marks)

Write the SQL statements to accomplish the following tasks.

1. Insert the following data into the tables customers, accounts, deposits and withdraw. (8 Marks for the insert statements, 1 mark for question2 and 2 marks for each question from question3 to question 10)

customers

accountno	name	phone	age
200	James	0782554544	30
300	Maria	0702333441	20
400	John	0752345522	19

accounts

accountno	balance	accounttype
200	50000	savings
300	60000	savings
400	70000	current

Deposits

accountno	amount	ddate
200	50000	2024-03-15
300	60000	2024-03-15
400	70000	2024-03-16

Withdraw

accountno	amount	wdate
200	20000	2024-04-20
300	30000	2024-05-22
400	40000	2024-04-22

2. Display names of all the customers in the bank.
3. Display names of customers and their account numbers.
4. Change the age of James to 40.
5. Display names of customers who are 20 and above.
6. Display the average age of all customers in bank.
7. Display names and phone numbers of all customers whose names begin with letter J.
8. Display the total amount of money deposited on 2024-03-15
9. Display names of customers who withdrew money on 2024-04-22.
10. Display the total amount of money withdrew in the month of April.

END