UNIVERSITY EXAMINATIONS

EXAMINATION FOR JANUARY/APRIL 2023/2024 FOR DIPLOMA IN COMPUTER SCIENCE/DIPLOMA IN INFORMATION TECHNOLOGY/DIPLOMA IN BUSINESS INFORMATION TECHNOLOGY

RCS015/RCS037 INTRODUCTION TO DATABASES

DATE: 18TH APRIL 2024 **TIME: 2 HOURS**

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination question paper during exam time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) cover page in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 1hour to the end of the Exam.**
10. **DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A (COMPULSORY)

QUESTION ONE (COMPULSORY, 30 MARKS).

a) Differentiate the following terms as used in SQL **(10 marks)**

i. Strong entity and weak entity.

ii. Entity type and Entity set.

iii. Primary key and foreign Key

iv. Single valued and multi-valued.

v. Tuple and attribute

b) Outline the three major types of relationships used when designing an Entity Relation Diagram. **(3 marks)**

For **questions c to h,** state whether it is true or false. If **false** explain the reason for your answer.

c) Normalization is necessary in the creation of a Database management system **(2marks)**

d) Indexes in a database improve the performance of queries but slow down data modification operations like INSERT, UPDATE, and DELETE. **(2marks)**

e) Data concurrency control can be present when one uses a file-based approach **(2marks)**

f) A database schema defines the structure of the database, including tables, fields, and relationships between tables. **(2marks)**

g) In a relational database, a join operation combines rows from two or more tables based on a related column between them. **(2 marks)**

h) In a relational database, a composite key consists of two or more columns that uniquely identify each row in a table **(2marks)**

i) Highlight any three advantages and two disadvantages of a Database Management System. **(5 marks)**

SECTION B (OPTIONAL 2 OUT OF 4)

QUESTION TWO (15 MARKS)

a) Describe the purpose of the following commands used in SQL. Use an example to demonstrate your understanding.

i. INSERT **(3marks)**

ii. CREATE **(4marks)**

b) Study the small case study and answer the questions that follow.

Dream Home has branch offices in cities throughout Kenya Namely: Kisumu, Nakuru, Mombasa and Nairobi. Each branch office is allocated members of staff, including a Manager, who manages the operations of the office. The data describing a branch office includes a unique branch number, address (street, city, and postcode), telephone numbers (up to a maximum of three), and the name of the member of staff who currently manages the office. Additional data is held on each Manager, which includes the date that the Manager assumed/got his or her position at the current branch office, and a monthly bonus payment based upon his or her performance in the property for rent market.

i. As per the case study you have read what would be the appropriate name for your table **(1mark)**

ii. Identify the column names and the datatype for each column you will come up with in order to create the table **(7marks)**

QUESTION THREE (15 MARKS)

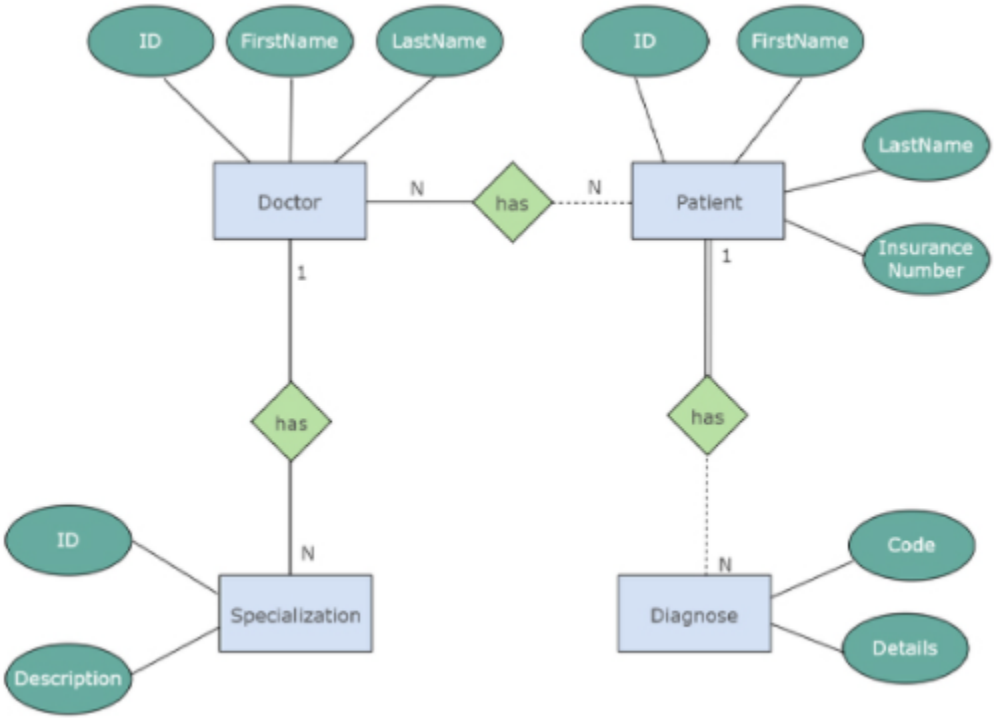
a) Define the following terms as used in databases: **(3 marks)**

i. Relation

ii. Relationship

iii. Field

b) Study the diagram below and answer the questions that follow:



i. Define the type of binary relationship present between:
   - Doctor and specialization **(1mark)**
   - Doctor and patient **(1mark)**
   - Patient and Diagnosis **(1mark)**

ii. State how many entities are present in the scenario above **(1mark)**

iii. Outline the entities and their respective attributes that have been used in the diagram. **(8marks)**

QUESTION FOUR (15 MARKS)

a) Answer the questions that follow by write the appropriate SQL command to us

i. Supposing in your Database management system had the following databases: Procurement, Customers and Employees. As a database manager you want to see all the databases present. **(1 mark)**

ii. From question (i), we have three databases. However, you want to activate **customers** so that you can see the tables. **(2 marks)**

iii. You want to add an additional database called **Logistics** **(2 marks)**

iv. Inside the **Logistics** database, you want to have a table called **shippment** that has the following information: shipid,ship Name,direction of travel, Type of shippment **(5marks)**

v. Now that you have your table called **shippment** ready, use the appropriate command to put four records into the table. **(5marks)**

QUESTION FIVE (15 MARKS)

a) Constraints are the rules enforced on data columns on table. Outline any five types of constraints. **(5 marks)**

b) Using the Employee table below write SQL statements to display the required results

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

i. A list of male employees earning more than 80,000. Their id and name should also be displayed alongside the salary and department **(3 marks)**

ii. A list of female employees who do not work in the sales department. All the fields should be displayed in the results **(3marks)**

iii. Generate a report of all the staff. **(2marks)**

iv. Display staff whose age is greater than or equal to thirty. **(2marks)**