SIR ARTHUR LEWIS COMMUNITY COLLEGE

FACULTY OF ENGINEERING

ACADEMIC YEAR (2024/2025) – SEMESTER TWO

END OF SEMESTER EXAMINATION

LECTURER(S)	**:**	**Miss Kem Emmanuel**
PROGRAMME TITLE	**:**	**Computer & Information Technology**
COURSE TITLE	**:**	**Database Management**
COURSE CODE	**:**	**CIT215**
LEVEL	**:**	**Associate Degree/Year Twos**
PAPER	**:**	**One**
DATE	**:**	**Friday, 9th May 2025**
COMMENCEMENT TIME	**:**	**1:00 p.m.**
DURATION	**:**	**Two (2) hours**
INVIGILATOR(S)	**:**	**N. Joseph (Chief),** A.S-Rojo & C. John
ROOM(S)	**:**	**VAR-0R-01**

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consists of Three (3) Sections. All questions must be attempted on the foolscap provided.
- **Section A** contains Twenty (20) Multiple Choice Questions. You are required to answer **all** questions. One mark is awarded for each correct answer.
- **Section B** contains Six (6) Short Answer Questions. You are required to answer **all** questions. Marks are awarded accordingly.
- **Section C** contains Two (2) Long Answer Questions. You are required to answer **both** questions. Marks are awarded accordingly.
- Students must sign **IN** and **OUT** on the examination class list.
- Students must **not** write their names on their answer sheets, only their ID number.
- Students are reminded to read **all** questions and instructions in each section very carefully.
- Please number your responses accordingly.

DO NOT TURN THIS COVER SHEET UNTIL

YOU ARE TOLD TO DO SO!!!

SECTION A: Multiple Choice Questions

Answer all questions. (One mark will be awarded for each correct answer)

1. Which key uniquely identifies each record in a table?
   a) Foreign key
   b) Unique key
   c) Composite key
   d) Primary key

2. Which of the following is a disadvantage of data redundancy?
   a) Faster access
   b) Inconsistent data
   c) Better performance
   d) Offline availability

3. Which of the following SQL commands is used to retrieve data from a database?
   a) INSERT
   b) UPDATE
   c) SELECT
   d) DELETE

4. A record in a table is also known as a
   a) Attribute
   b) Tuple
   c) Field
   d) Relation

5. Which of the following statements is true about relational databases?
   (i) They use tables to represent data
   (ii) Every table must have a unique identifier (primary key)
   (iii) Relationships are defined using foreign keys
   (iv) Tables a linked using parent child relationships

   a) (i), (ii), and (iii)
   b) (i) and (iv)
   c) (ii), (iii), and (iv)
   d) (i), (ii), (iii), and (iv)

6. Which SQL statement is used to modify existing data?
   a) MODIFY
   b) CHANGE
   c) ALTER
   d) UPDATE

7. Which command is used to remove a table from a database?

   a) REMOVE TABLE

   b) DELETE TABLE

   c) DROP TABLE

   d) CLEAR TABLE

8. Which of the following data models uses tree-like structures?

   a) Relational

   b) Hierarchical

   c) Network

   d) Object-oriented

9. A college stores student data including name, ID, and course enrollment in separate tables. The Registrar wants to generate a report combining names and enrolled courses. What should be used?

   a) INSERT query

   b) DELETE query

   c) JOIN operation

   d) Primary key

10. Which of the following operations are part of SQL's CRUD operations?

    (i) Create

    (ii) Read

    (iii) Update

    (iv) Drop

    a) (i), (iii), and (iv)

    b) (i), (ii), and (iv)

    c) (i), (ii), and (iii)

    d) (i), (ii), (iii), and (iv)

11. A company needs to ensure that every time a new employee is added to the employee table, a log entry is automatically created. What should be used?

    a) View

    b) Trigger

    c) Stored procedure

    d) Index

12. In a hospital management system, you define a Person class and inherit Patient, Doctor, and Nurse classes from it. Which OODBMS feature are you using?

    a) Encapsulation

    b) Inheritance

    c) Polymorphism

    d) Aggregation

13. Which of the following are types of relationships in relational databases?

(i) One-to-One

(ii) One-to-Many

(iii) Many-to-Many

(iv) One Parent-to- Many Children

a) (i), (ii), and (iv)

b) (ii), (iii), and (iv)

c) (i), (iii), and (iv)

d) (i), (ii), and (iii)

14. Which of the following is a disadvantage of PHP in web database applications?

a) It's too expensive

b) Not suitable for small projects

c) It’s less secure due to being open-source

d) Only works with Apache web servers

15. An e-commerce website expects a spike in traffic during holiday sales and needs a database that can scale across multiple servers. Which NoSQL feature addresses this?

a) Normalization

b) Vertical scaling

c) Schema-on-write

d) Horizontal scaling

16. A tourism company wants to collect user feedback from its website and store it in a database. They use PHP for the backend.

What feature of PHP makes it ideal for handling this task?

a) It encrypts all user data automatically

b) It runs only in browser memory

c) It includes built-in modules for database connections.

d) It disables user sessions

17. Which tier of a 3-tier architecture contains the business logic?

a) Presentation Tier

b) Application Tier

c) Database Tier

d) Client Tier

18. A trigger in SQL is

(i) An automated response to data modification

(ii) A stored procedure

(iii) Used to define data structure

(iv) A kind of DDL statement

a) (i) only

b) (i) and (ii)

c) (ii) and (iii)

d) (i) and (iv)

19. A logistics company uses a NoSQL graph database to model and query routes between multiple cities. What is the main advantage here?

a) Fast numeric calculations

b) Simplified CRUD operations

c) Efficient relationship mapping

d) Better table joins

20. You're designing a simulation system where entities like *Vehicle*, *Aircraft*, and *Boat* inherit from a base *Transport* class. You want to ensure object persistence across sessions, including methods. Which challenge does a relational DB present here that an OODBMS handles more efficiently?

a) Normalizing many-to-many relationships

b) Storing function pointers in binary

c) Mapping object methods and class hierarchies

d) Generating unique primary keys

Total (20 marks)

SECTION B: Short Answer Questions.

Answer all questions. (Marks are awarded accordingly)

1. Name and define the two types of data access languages. (**4 marks**)
2. Define the term data model. (**2 marks**)
3. Differentiate between SQL and NoSQL databases stating how data is stored. (**4 marks**)
4. Describe the process of how a web browser communicates with a web server to retrieve and display a database-driven webpage. (**5 marks**)
5. Compare and contrast Java Servlets and CGI scripts, including their performance, scalability, and security considerations. (**6 marks)**
6. List four advantages of using a three-tier architecture in DBMS. (**4 marks**)

Total (25 Marks)

SECTION C: Long Answer Questions

Answer both questions (Marks are awarded accordingly)

1. An Agriculture Information System (AIS) has been developed for St. Lucia to keep track of Farm and Farmer registration data and crop production. A portion of the database schema is given below:

   Farm (FarmId, District, Size, SoilType, FarmerId, LandTenure)
   Farmer (FarmerId, FarmerName)
   Crop(CropId, CropType, Variety, AnnualProduction)
   CropCycle (CropCycleId, CropId, FarmID, DatePlanted, DateOfHarvest, QuantityHarvested)

   a. Create an Entity Relationship Diagram for the above database schema. (**9 marks**)

   b. Write an SQL statement to enter the following into the CropCycle table:
   On 4th November 2015, a crop of Tomatoes (Cropld 'Tom') was planted on Farm 'Br534'. Use CropCycleid 567.

   (**6 marks**)

2. The table shown below lists sample doctor/patient appointment data. A patient is given an appointment at a specific time and date with a doctor for a particular surgery. On each day of patient appointments, a doctor is allocated to a specific surgery for that day. Hence, Dr. Gobin Lall is given S25 ('Heart Surgery') to perform on 12-Dec-2019 while Dr. Linda Hall is given S25 ('Heart Surgery') to perform on 14-Dec-2019.

Num	doctorName	Num	patientName	appointment	Num	surgeryName
85577	Gobin Lall	P200	Jill Smith	12-Dec-2019	S25	Biopsy
85577 85598	Gobin Lall Linda Hall	P205	Harry Paul	12- Dec-2019 14 - Dec-2019	S25 S23	Biopsy Skin Graft
85582	Robin Patel	P208	Jerome Hilt	12- Dec-20 19 14- Dec-2019	S20	Cataract
85598	Linda Hall	P210	Cindy John	15- Dec-20 19	S23	Skin Graft

a. Describe and illustrate the process of normalizing the table to 1NF relations. (**8 marks**)

b. Describe and illustrate the process of normalizing the table to 2NF relations. (**6 marks**)

c. Describe and illustrate the process of normalizing the table to 3NF relations. (**6 marks**)

Total (35 Marks)

END OF EXAMINATION!!!