



**PAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**FACULTY OF COMPUTING AND INFORMATICS**  
DEPARTMENT OF SOFTWARE ENGINEERING

<b>QUALIFICATION:</b> BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATICS, BACHELOR OF CYBER SECURITY, BACHELOR OF GEOINFORMATICS, BACHELOR OF LAND ADMINISTRATION	
<b>QUALIFICATION CODE:</b> 07BCMS, 07BAIT, 07BCCS, 07BGEI, 07BLAM, 06DPRS	<b>LEVEL:</b> 5
<b>COURSE:</b> DATABASE FUNDAMENTALS	<b>COURSE CODE:</b> DBF510S
<b>DATE:</b> JULY 2024	<b>PAPER:</b> THEORY
<b>DURATION:</b> 2 HOURS	<b>MARKS:</b> 70

<b>SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER</b>	
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**THIS QUESTION PAPER CONSISTS OF 5 PAGES**  
(Including this front page)

**INSTRUCTIONS TO STUDENTS**

1. Attempt all Questions.
2. All questions have to be answered in the Answer Booklet. Clearly indicate the section and question number for each answer.
3. The allocation of marks is an indication of the extent of the expected answer. Answering more than expected does not result in higher marks. Keywords alone are not enough.
4. There are no books, notes or any other additional aids allowed in the examination.

Answer ALL the questions in this paper.

**SECTION A:**

[Marks: 20]

**Question 1:**

**Multiple Choice Questions**

[10 Marks]

- Answer all the questions in the answer booklet that has been provided.
  - Select the best answer.
1. Which of the following is a data-oriented methodology used to create information systems?
    - a) Data modelling.
    - b) Information engineering.
    - c) Information architecture.
    - d) System analysis.
  
  2. The SDLC phase in which functional data specifications and processing rules are created is called:
    - a) Planning phase.
    - b) Design phase.
    - c) Analysis phase.
    - d) Implementation phase.
  
  3. A relation that contains no multivalued attributes, has nonkey attributes solely dependent on the primary key, but contains transitive dependencies is in which normal form?
    - a) First
    - b) Second
    - c) Third
    - d) Fourth
  
  4. Which of the following is NOT a cost and/or risk of the database approach?
    - a) Specialised personnel.
    - b) Cost of conversion.
    - c) Improve responsiveness.
    - d) Organisational conflict.
  
  5. In a relational database, what is a primary key?
    - a) A key used to unlock the database.
    - b) A unique identifier for each record in a table.
    - c) A key used to establish relationships between tables.
    - d) A key used for sorting records in a table.
  
  6. Which type of join returns all records when there is a match in either left or right table?
    - a) Inner join.
    - b) Left outer join.
    - c) Right outer join.
    - d) Full outer join.

7. What is the purpose of the SQL SELECT DISTINCT statement?
  - a) It is used to delete duplicate records from a table.
  - b) It is used to select only unique values from a specified column.
  - c) It is used to select records based on a specific condition.
  - d) It is used to sort the records in a table in descending order.
  
8. Which of the following is NOT a type of SQL join?
  - a) Inner join.
  - b) Full outer join.
  - c) Left outer join.
  - d) Parallel join.
  
9. What is the purpose of the SQL GROUP BY clause?
  - a) To sort the results of a query.
  - b) To filter records based on a condition.
  - c) To perform aggregate functions on groups of data.
  - d) To join multiple tables together.
  
10. Which SQL command is used to modify existing data in a database?
  - a) ALTER
  - b) UPDATE
  - c) MODIFY
  - d) CHANGE

**Question 2**

**[10 marks]**

Indicate whether the following statements are **True** or **False** in your answer booklet.

ID	Statement/Description	True	False
1	DCL is used to update the database with new records.		
2	A referential integrity constraint specifies that the existence of check constraints in the same or another table.		
3	Character strings and dates in the WHERE clause must be enclosed in single quotation marks.		
4	In SQL, the UNION operator is used to combine the results of two or more SELECT statements into a single result set.		
5	In a relational database, a table is also known as a tuple.		
6	Data redundancy is beneficial in a database because it improves data integrity.		
7	A transaction in a database is a single unit of work that must be completed entirely or not at all.		
8	All aggregate functions except COUNT(*) ignore null values in their input collection.		
9	The NATURAL JOIN clause is based on columns in the two tables that have the same name and datatype.		
10	DESC can be used with the order by clause to sort a table in descending order.		



**SECTION B: CONCEPTS****[Marks: 10]**

1. Explain the following terms with an example.
  - a) Alias [2 Marks]
  - b) Primary Key [2 Marks]
2. List any 2 disadvantages of the file processing system. [1 Mark]
3. Correct the following code so that it joins the tables employees and Job\_history based on common column emp\_id which is found in both tables? [3 Marks]

```
SELECT emp_id, job_id, dept_id
FROM employees
JOIN
SELECT emp_id, job_id, dept_id
FROM job_history;
```

4. What is the purpose of the ROLLBACK statement in SQL? [2 Marks]

**SECTION C: COMPREHENSION****[Marks: 40]**

1. Given the following scenario create an appropriate ER diagram. Include at least 3 attributes and 1 primary Key for each entity. Include the cardinality and relationships. Use Crow's Foot Notation. [15 Marks]

A hospital has multiple departments, such as Cardiology, Paediatrics, and Orthopaedics. Each department has a department ID and name. Doctors work in one or more departments and have a doctor ID, name, specialty, and contact information. Patients visit the hospital and are assigned to one or more doctors for treatment. Each patient has a patient ID, name, date of birth, and medical history.

2. Write an SQL query to create a table called Athletes using the information provided in the table below. Choose relevant datatypes and include a primary key. [8 Marks]

Athlete_id	Last_name	First_name	Sporting Event speciality
101	Mboma	Christine	200m runner
111	Fredericks	Frankie	100m runner
121	Johannes	Helalia	Marathon runner
131	Velho	Merylese	Sprinter
141	Benson	Johanna	Paralympian

3. Write a query to insert all the 5 rows into the table Athlete as shown in Q. 2. [5 Marks]
4. Write a query to check if all the rows have been added to the table Athlete. [2 Marks]
5. Frankie Fredricks has requested that his name be replaced with Harry Simon who is a boxer. Write a query that modify Frankie Fredricks to Harry Simon using the same Athlete\_id. [5 Marks]
6. Jahanna Benson has retired from athletic activities and would like to be removed from the table. Write a query that will make this change. [2 Marks]
7. Write a query to find all the sporting events that have the word runner in the Athlete table. [3 Marks]

\*\*\*\*\* End of the Paper \*\*\*\*\*