JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION COMMUNICATION TECHNOLOGY

1ST YEAR 2ND SEMESTER 2024/2025 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: ITB 1110
COURSE TITLE: DATABASE SYSTEMS

EXAM VENUE: STREAM: BSc. ICT

DATE: 22/4/2025 **EXAM SESSION: 15.00-17.00**

TIME: 2.00 HOURS **VENUE: LAB 8**

INSTRUCTIONS:

1. **Answer Question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on the question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE – 30 MARKS

1. Which of the following commands are used to terminate a transaction? Each correct answer represents a complete solution. Choose all that apply.

A. TRUNCATE

B. DELETE

C. ROLLBACK

D. COMMIT

2. Peter works as a Database Administrator for Unreal Tech Inc. Management instructs him to create a schema that is gradually expanded from one level to another through appropriate modifications. Which of the following approaches will he use to accomplish the task?

A. Top down approach

B. Bottom up approach

C. Mixed approach

D. Inside-out approach

3. Which of the following is undertaken at any time prior to the logical design, provided that sufficient information is available regarding system requirements?

A. Application design

B. Prototyping

C. DBMS selection

D. Database planning

4. Masai works as a Database Administrator for JOOUST. He wants to remove the columns from a table that are not dependent on the primary key. Which of the following normal forms will help him accomplish the task?

A. 4 NF

B. 6 NF

C. 5 NF

D. 3 NF

5. Which of the following statements are correct regarding recovery of the InnoDB tables after a server crash? Each correct answer represents a complete solution. Choose all that apply. A. They can only be recovered from the dump files.

B. They are automatically recovered at the server startup.

C. They are recovered only after restarting the server with the innodb_force_recovery option configured.

D. The innodb_force_recovery option opens the InnoDB tables in the read-only mode.

6. Which of the following ensures referential integrity between tables?

A. Foreign key

B. CHECK constraint

C. Index

D. Primary key

7. Which of the following terms is described in the following statement? *"It is a collection of conceptual tools for describing data, data relationship, data semantics, and consistency constraints."*

A. Data model

B. Generic Data Model

C. Relational model

D. Entity-Relationship Model

8. Which of the following are the correct statements of using the Flashback Query feature in Oracle? Each correct answer represents a complete solution. Choose all that apply.

A. CREATE TABLE AS SELECT AS OF

B. SELECT AS OF

C. CREATE TABLE AS SELECT

D. INSERT INTO (SELECT)

9. Which of the following are the steps of database planning life cycle? Each correct answer represents a part of the solution. Choose three.

A. Application Design

B. Data conversion and loading

C. Conceptual database design

D. Operational Maintenance

10. Which of the following statements about external tables is true? A.

They can have constraints or triggers.

B. They cannot be written to with DML commands.

C. They can have indexes.

D. They cannot be used in joins, views, and subqueries

11. Properties of an object are stored as rows in a table. **True/False**
12. DBMS stores data efficiently with little wasted space **True/False**
13. Multiple constraints can be included in a single query **True/False**
14. The primary key does not necessarily have to be unique for a given table. **True/False**
15. Conventional files are relatively difficult to design and implement because they are normally designed for use with multiple applications or information systems. **True/False**
16. Most organizations build several databases, each one sharing data with several information systems. Thus, there will be some redundancy between databases **True/False**
17. A foreign key is a field whose values identify one and only one record in the same file. **True/False**
18. A good data model should be flexible and adaptable to future needs **True/False**
19. Referential integrity means that every table should have a unique, primary key, whose value is NOT NULL. **True/False**
20. Duplication of data items in multiple files is normally cited as the principal disadvantage of file-based systems. **True/False**
21. Currency, text and decimal are examples for _____ types.
22. An application where only one user accesses the database at a given time is an example of a(n) _____ .
23. An on-line commercial site such as Amazon.com is an example of a(n) _____ .
24. Multivalued dependencies should _____ be eliminated.
25. In a one-to-many relationship, the entity that is on the one side of the relationship is called a(n) _____ entity.
26. A recursive relationship is a relationship between an entity and _____ .
27. A primary key should be defined as:_____ .
28. The first step in database development is _____
29. Locks placed by command are called _____ .
30. _____ is the process of upgrading legacy systems with quality of data in data warehousing

QUESTION TWO (20 MARKS)

a) Describe the ANSI/SPARC three level architecture for database management systems software and explain the advantages it provides. [9 Marks]

b) Study the Table t below and answer the following questions

Student ID	Student Name	Degree	Tel no	County
BIT/40	Jane	BED	0712365965	Nakuru
MED/389	Peter	MED	0712369852	Kisumu
BIT/448	David	BIT	0717456325	Nairobi
BCOM/13	Ann	BCOM	0712369852	Meru
BBIT/20	Betty	BBIT	0717456821	Nairobi

Table t

i. Write SQL statement to CREATE the above table and insert the data in the table [6 Marks]

ii. Write SQL statement to add the first record. [2 Marks]

iii. Write SQL statement to display all the records from the table. [3 Marks]

QUESTION THREE (20 MARKS)

a) What is a Mobile Database? [2 Marks]

b) Explain FOUR referential actions commonly used when defining foreign keys. [8 Marks]

c) State and explain the TWO kinds of data independence in Database Management Systems. [4 Marks]

d) State any THREE properties of relations in a relational database. [3 Marks]

e) A database designer requires that the values for PFNo in the table SalaryRates to be four-character values in the column PFNo in the table Employees. Write a SQL script to create this domain constraint. [3 Marks]

QUESTION FOUR (20 MARKS)

a) Outline major steps that you would take in setting up a database for a particular enterprise,

with full explanation of an enterprise your choice [10 Marks]

b) State and explain the three types of relationships in relational databases, using at least for

pairs of database tables for each to depict the relationship [5 Marks] c) Giving examples, differentiate between shared lock and exclusive lock as used in transaction management in the Database Management System. [5 Marks]

QUESTION FIVE (20 MARKS)

a) Discuss the concept of data redundancy? [3 Marks]

b) Discuss data normalization? [2 Marks]

c) Describe five advantages of normalization in a database. [5 Marks]

d) Using SQL script, explain how to create a database and a table. [5 Marks]

e) Discuss five advantages of using database systems as opposed to file systems. [5 Marks]