

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Level : B.E.

Year : III

Time : 2 hrs. 30 mins.

Course : GEOM 318

Semester : I

F.M. : 40

08 FEB 2024

SECTION "B"

[8Q × 5 = 40 marks]

Attempt *ANY EIGHT* questions.

1. What is a Geodatabase? List and explain the features of Spatial Database. [5]
2. What is an Entity-relationship model? Explain using different components and notations. Support your answer with the help an ER-diagram for Customer tracking system. [5]
3.
 - a. What do you understand by relation in a Relational Database Model? [2]
 - b. Explain the database development cycle. [3]
4. Define Data Definition Language, Data Manipulation Language, Data Control Language and Data Query Language. List different commands and description to support your answer. [5]
5. For the following relation schema: [5]
employee(employee-name, street, city)
works(employee-name, company-name, salary) company(company-name, city)
manages(employee-name, manager-name)
Give an expression in SQL for each of the following queries:
 - a. Find the names of all employees in the database who do not work for 'First Bank Corporation'. Assume that all people work for exactly one company.
 - b. Find the names of all employees in the database who live in the same cities and on the same streets as do their managers.
 - c. Find the names, street address, and cities of residence for all employees who work for 'First Bank Corporation' and earn more than \$10,000.
6. How is Spatial DBMS different from Traditional DBMS (Non-spatial)? Mention supportive examples and queries. [5]
7. What is Spatial Data Mining? Explain its process using real-life example in the spatial context. [5]
8. What do you mean by Spatial Indexing? List and explain different types of Spatial Query Operations. [5]
9. You have a shapefile of Bagmati province with all the local administrative units, and a shapefile of road network of Nepal. Write SQL queries to perform the following operations:
 - a. What is the largest municipality in Bagmati province, by area?
 - b. What is the length of roads fully contained within each municipality in Bagmati province?
 - c. What is the total length of all roads, expressed in kilometers?

[5]

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10. Write short notes on *ANY TWO*.
- a. Cardinality
 - b. SQL Aggregate Functions
 - c. Nested Queries
 - d. Normalization

[2 × 2.5 =5]

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Marks Scored:

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Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices.

1. What is a primary key in a relational database?
 - a. A unique identifier for each record in a table
 - b. A field that stores the most important information in a record
 - c. A field that contains a summary of the data in a record
 - d. A field that stores the date a record was created
2. Which of the following is **NOT** a function of the database?
 - a. Managing stored data
 - b. Manipulating data
 - c. Security for stored data
 - d. Analyzing code
3. What is a data dictionary in a DBMS?
 - a. A collection of metadata
 - b. A collection of data
 - c. A collection of SQL statements
 - d. A collection of user-defined functions
4. What does an RDBMS consist of?
 - a. Collection of Records
 - b. Collection of Keys
 - c. Collection of Tables
 - d. Collection of Fields
5. What is a join operation in a relational database?
 - a. A query that retrieves data from multiple tables based on related data
 - b. A query that retrieves data from a single table based on related data
 - c. A query that retrieves data from a single table based on a specific condition
 - d. A query that retrieves data from multiple tables based on a specific condition
6. The DBMS acts as an interface between _____ and _____ of an enterprise-class system.
 - a. Data and the DBMS
 - b. Application and SQL
 - c. Database application and the database
 - d. The user and the software
7. Which of the following set should be associated with weak entity set for weak entity to be meaningful?
 - a. Neighbor set
 - b. Strong entity set
 - c. Owner set
 - d. Identifying set
8. Which of the following command is correct to delete the values in the relation teaches?
 - a. Delete from teaches;
 - b. Delete from teaches where Id ='Null';
 - c. Remove table teaches;
 - d. Drop table teaches;

9. What is the purpose of spatial indexing in a SDBMS?
- Improving the performance of spatial queries
 - Enabling the storage of 3D data
 - Allowing for the use of multiple coordinate systems
 - Providing support for raster data
10. Which of the following is NOT a common operation in a spatial query language?
- Buffer
 - Union
 - Sorting
 - Intersection
11. What does this figure represent?



- one to one
 - one to many
 - one or more
 - one and only one
12. What is Spatial Association?
- relation between relation pattern of two or more regions
 - group database objects so that the most similar objects are in the same cluster
 - whether a spatial entity belongs to a particular class or set
 - sets of spatial features often located near each other
13. What is the purpose of the ST_Within() function in a spatial query language?
- To select features that are entirely contained within a specified geometry
 - To select features that are partially contained within a specified geometry
 - To select features that are entirely outside of a specified geometry
 - To select features that are partially outside of a specified geometry
14. What type of spatial data type is used to represent a collection of point, linestring and polygon in a spatial database?
- MultiGeometry
 - GeometryCollection
 - Feature
 - ComplexGeometry
15. What is the function of the following command?
Delete from r where P;
- Clears entries from relation
 - Deletes relation
 - Deletes particular tuple from relation
 - Incorrect query
16. What is the main purpose of spatial data mining?
- Identifying patterns and relationships in spatial data
 - Enhancing the performance of spatial queries
 - Improving the storage efficiency of spatial data
 - Handling high-dimensional data
17. What is PostGIS?
- A spatial database management system
 - A spatial data visualization tool
 - A spatial data formats
 - A spatial data analysis software

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18. The logical design, and the snapshot of the data at a given instant in time is known as?
- a. Instance & Relation
 - b. Relation & Schema
 - c. Domain & Schema
 - d. Schema & Instance

19. Why the following statement is erroneous?

```
SELECT dept_name, ID, avg (salary)
FROM instructor
GROUP BY dept_name;
```

- a. Dept_id should not be used in group by clause
 - b. Group by clause is not valid in this query
 - c. Avg(salary) should not be selected
 - d. It is correct
20. The ability to query data, as well as insert, delete, and alter tuples, is offered by _____
- a. TCL (Transaction Control Language)
 - b. DCL (Data Control Language)
 - c. DDL (Data Definition Language)
 - d. DML (Data Manipulation Language)

