

KATHMANDU UNIVERSITY
End Semester Examination
July/August 2024

Level : B. E.
Year : III
Time: 2 hrs. 30 mins.

13 AUG 2024

Course : GEOM 318
Semester : I
F. M. : 40

SECTION "B"

[8 Q. × 5 = 40 marks]

Attempt *ANY EIGHT* questions. Assume suitable data when necessary. Figures in the braces indicate full marks.

1. What do you understand by Database Management System (DBMS)? Explain the difference between data and information with proper illustration. [1+4]
2. Explain in brief about the components of DBMS. What are the advantages of storing spatial data in a DBMS as opposed to a file system? [2+3]
3. Explain the key concept of big data highlighting different V's associated with big data. What is data mining? Explain the major three techniques of spatial data mining. [2.5+2.5]
4. What is database design, and what are its primary objectives? Explain the normal database design lifecycle, including the important steps and why they are necessary to build a successful database system. [5]
5. Introduce database language along with its types. How are SQL Query processed? Explain the architecture behind query processing with proper illustration. [2+3]
6. Spaghetti, Network, and Topological model are three frequently utilized spatial object representations for illustrating geometry. Provide a short overview of each type along with their main advantages and disadvantage. [5]
7. Write Short notes on: (*ANY TWO*) [2.5+2.5]
 - a. Voronoi Diagram
 - b. Field and Object Based Spatial Data Model
 - c. Network Database Model
8. You are required to create and manage a database for a library's book collection. Please address the following tasks:
 - a. Write an SQL statement to create a table named **Books** with following fields: [1]
Title (VARCHAR) ISBN (VARCHAR)
Published_Year (INT) Publisher (VARCHAR)
 - b. Write SQL statements to insert the following records : [2]
Title: "The Great Gatsby", ISBN: "9780743273565", Published_Year: 1925, Publisher: "Scribner"
Title: "1984", ISBN: "9780451524935", Published_Year: 1949, Publisher: "Harcourt Brace"
Title: "To Kill a Mockingbird", ISBN: "9780060935467", Published_Year: 1960, Publisher: "J.B. Lippincott & Co."
 - c. Write an SQL query to select all books from the Books table where the Publisher is "Scribner". [1]

P.T.O.

9. A multinational corporation is evaluating database systems to fulfill its diverse and complex data requirements, including managing intricate relationships, supporting complex and ad-hoc queries, ensuring data precision, and maintaining scalability and effectiveness.

Considering these criteria, which database model - Network, Relational, or Hierarchical - would be more suitable? Offer a thorough explanation for your suggestion, considering the pros and cons of each model. [5]

10. Which SQL function is used to count the number of rows in a table?
a. COUNT() b. SUM() c. MAX() d. AVG()
11. Which of the following correctly describes the ACID properties of a DBMS?
a. Atomicity, Consistency, Isolation, Durability
b. Accessibility, Concurrency, Integrity, Data reliability
c. Accuracy, Consistency, Isolation, Data integrity
d. Atomicity, Correctness, Isolation, Data preservation
12. In relational databases, what is meant by "data independence"?
a. Users can access data without restrictions.
b. Changes to the database structure do not affect application programs.
c. Data can be stored in multiple formats.
d. Data can be accessed from multiple locations.
13. Which of the following SQL commands is used to remove a table from the database?
a. DELETE TABLE b. REMOVE TABLE
c. DROP TABLE d. ERASE TABLE
14. Which operation is commonly used to determine the spatial relationship between two geometries?
a. Spatial join b. Buffering c. Clipping d. Intersection
15. What does the term "cardinality" refer to in a relational database?
a. The number of attributes in a relation
b. The number of tuples in a relation
c. The uniqueness of rows
d. The relationship between tables
16. Which of the following is a characteristic of a relational database model?
a. Complex data retrieval
b. Non-navigational access
c. Data stored in hierarchical structures
d. Dependence on physical storage
17. Which of the following best describes a 'composite attribute' in an ER model?
a. An attribute that can have multiple values
b. An attribute that is derived from other attributes
c. An attribute composed of several other attributes
d. An attribute that serves as a primary key
18. Which language is often used for spatial queries in SDBMS?
a. SQL b. SSQL (Spatial SQL)
c. NoSQL d. XML
19. What is a common standard for spatial data in SDBMS?
a. OGC b. IEEE c. ISO d. ANSI
20. Which of the following SQL is used as standard database language in Oracle?
a. PL/SQL b. T-SQL c. JET-SQL d. Both a and b