CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 19 August 2025. Afternoon Paper. **Time Allowed: 2 hours.**

This paper consists of fifty (50) Multiple Choice Questions. Answer ALL questions by indicating the letter (A, B, C or D) that represents the correct answer. Each question is allocated two (2) marks.

1. Which one of the following database properties, part of the ACID principles, specifically ensures that a transaction is treated as a single, indivisible unit of work, meaning it is either entirely completed and committed to the database or entirely rolled back with no changes applied?
   A. Durability
   B. Isolation
   C. Consistency
   D. Atomicity (2 marks)

2. In database transactions, what state represents a transaction that has started but not yet completed, indicating it is actively performing operations but has not yet reached a commit or rollback point?
   A. Committed
   B. Rolled back
   C. Active
   D. Terminated (2 marks)

3. In the realm of business intelligence and data warehousing, organisations leverage various technologies to extract meaningful insights from vast datasets. Among these, Online Analytical Processing (OLAP) plays a critical role in facilitating strategic decision-making. Considering its functionalities, what is the primary role of OLAP in business intelligence?
   A. Supporting multidimensional data analysis
   B. Performing detailed transaction processing
   C. Managing user access rights
   D. Ensuring network security (2 marks)

4. Among the common structures used for storing database tables on disk, which one typically allows for records to be placed in any available location without a specific ordering, often relying on an index for efficient access?
   A. Text file
   B. Heap file
   C. Executable file
   D. Script file (2 marks)

5. Which one of the following is a widely recognised and commonly implemented type of data warehouse architecture, known for its simplicity and direct relationships between fact and dimension tables?
   A. Mesh topology
   B. Circular model
   C. Binary tree
   D. Star schema (2 marks)

6. Considering the fundamental design principles of a data warehouse, which one of the following is **NOT** a typical characteristic, implying it is usually associated with operational systems rather than data warehouses?
   A. Subject-oriented
   B. Time-variant
   C. Volatile
   D. Integrated (2 marks)

7. Which one of the following schemas is characterised by a central fact table directly connected to multiple denormalised dimension tables, creating a simple and often highly performant structure?
   A. Star schema
   B. Bus schema
   C. Snowflake schema
   D. Hierarchical schema (2 marks)

8. Considering the various processes involved in extracting value from data, which one of the following statements **BEST** defines data mining, a crucial analytical technique in this domain?
   A. Storing large data in cloud environments
   B. Extracting meaningful patterns from large datasets
   C. Visualising network architecture
   D. Developing mobile applications (2 marks)

9. To ensure data integrity and consistency in such environments, which one of the following techniques is specifically employed to handle concurrent access in databases by regulating operations on shared resources?
   A. Compiling
   B. Control panels
   C. Merging
   D. Locking (2 marks)

10. Which one of the following statements **CORRECTLY** differentiates OLTP from OLAP, highlighting their primary operational focus?
   A. OLTP handles historical data, OLAP processes real-time transactions
   B. OLAP supports complex queries and OLTP handles routine transactions
   C. OLAP is used for authentication and OLTP is used for reporting
   D. OLTP used dimensional modeling and OLAP used E-R modeling (2 marks)

11. Which particular CRISP-DM phase involves the crucial step of translating the overall project goals and business challenges into precise questions that data mining techniques can address?
   A. Modeling
   B. Evaluation
   C. Business understanding
   D. Data preparation (2 marks)

12. KPIs are quantifiable metrics that reflect the success of a business objective. In the context of a sales dashboard designed to monitor the effectiveness of sales operations, which one of the following would be considered a direct and crucial Key Performance Indicator?
   A. Number of backup servers
   B. Average response time
   C. Number of data warehouses

D. Monthly sales revenue (2 marks)

13. Which one of the following is universally recognised as the **CORRECT** first step in initiating a business process improvement or design effort?
A. Monitor and control
B. Define objectives
C. Evaluate performance
D. Hire staff (2 marks)

14. Which one of the following tools is primarily used in business process documentation for graphically illustrating the sequence of steps, decisions and parallel activities within a process?
A. Gantt Chart
B. Line graph
C. Histogram
D. Flowchart (2 marks)

15. The DIKW pyramid is a widely used hierarchy that illustrates how raw data can be transformed into increasingly valuable forms of understanding and insight. Which level represents actionable insight?
A. Data
B. Information
C. Knowledge
D. Wisdom (2 marks)

16. Which DBMS architecture **BEST** describes a system that logically separates the user's view, application logic and physical data storage?
A. Single-tier
B. Two-tier
C. Three-tier
D. One-tier (2 marks)

17. Information systems are foundational to modern organisations, enabling data collection, processing, storage and distribution. Which one of the following is **NOT** a core component of a DBMS?
A. Query processor
B. Storage manager
C. Data integrity checker
D. Data Mart (2 marks)

18. Composed of several interconnected parts, which of the following is an indispensable physical component of any computer-based information system, providing the infrastructure for computation?
A. Firmware
B. HCI
C. GPU
D. OS (2 marks)

19. Which one of the following is **NOT** a characteristic typically associated with valuable information as it would hinder clarity and usability?
A. Ambiguity
B. Accuracy

C. Timeliness
D. Relevance (2 marks)

20. What is the main goal of business process improvement typically focusing on operational effectiveness and resource utilisation?
A. Reducing staff
B. Eliminating products
C. Enhancing efficiency
D. Buying new software (2 marks)

21. Which one of the following is a common and powerful external factor that often compels organisations to innovate and adapt their offerings or operations?
A. Avoidance of competition
B. Resistance to change
C. Limiting resources
D. Customer needs (2 marks)

22. Which step in business process re-engineering centrally involves a radical overhaul of current operations often discarding old ways to create entirely new ones?
A. Redesign
B. Documentation
C. Execution
D. Marketing (2 marks)

23. Which element of an information system is ultimately responsible for interpreting information, making judgments and initiating actions based on system insights?
A. Hardware
B. Software
C. Procedures
D. People (2 marks)

24. Which of the following is a fundamental method used in data organisation where records are stored and accessed in a linear sequence, typically from beginning to end?
A. Command prompt
B. Sequential access
C. Wi-Fi protocol
D. Neural net (2 marks)

25. In software engineering, various models structure the development process from conceptualisation to deployment. Which one of the following models provides a framework for planning and managing software development?
A. Spiral model
B. Organic model
C. Evolution model
D. Water filter model (2 marks)

26. Which of the following is the very first and foundational step in the database design process, involving understanding what the database needs to achieve?
A. Normalise data

B. Define the tables
C. Requirements analysis
D. Write SQL queries (2 marks)

27. To maintain database consistency and ensure the final state is the same as if transactions were executed one after another, even when run simultaneously, which method is specifically employed to achieve this isolation property?
A. Redundancy
B. Serialisability
C. Synchronisation
D. Delay (2 marks)

28. Concurrency control mechanisms in database management systems manage simultaneous data access and prevent conflicts. What is the primary purpose of locking in concurrency control?
A. To prevent data inconsistency
B. To prevent unauthorised access
C. To reduce memory usage
D. To format SQL queries (2 marks)

29. Which SQL clause is specifically designed to combine rows from two or more tables, creating a new result set that includes data from all specified tables where their related columns match?
A. OBTAIN
B. SELECT
C. FETCH
D. GET (2 marks)

30. Which clause in SQL is used to combine rows from two or more tables based on a related column?
A. MERGE
B. BIND
C. JOIN
D. APPEND (2 marks)

31. In SQL, which feature is directly associated with verifying a user's identity and access privileges to the database?
A. Authentication
B. Normalisation
C. Data definition
D. Foreign key (2 marks)

32. Which specific technical term most precisely describes the logical organisation and physical arrangement of digital data, including its access methods and storage mechanisms on a permanent storage medium such as a hard disk drive or solid-state drive?
A. File pointer
B. File structure
C. Bit mask
D. Page view (2 marks)

33. What is the **MOST** significant objective of strategically creating and judiciously utilising indexes on specific columns within database tables, directly impacting system performance and efficiency?
A. Increase data redundancy

B. Slow down queries
C. Speed up data retrieval
D. Protect against malware (2 marks)

34. Which one of the following is an essential precursor for successfully implementing a data warehouse, involving the movement and transformation of data?
A. File compressor
B. Data mart
C. Query optimizer
D. ETL process (2 marks)

35. Which one of the following is **NOT** considered a factor leading to innovation in business processes?
A. Technological advancements
B. Employee creativity and skills
C. Market competition
D. Resistance to change (2 marks)

36. What is the primary and overarching function of a sophisticated database management system (DBMS), a crucial software application designed to interact with users, other applications and the database itself to facilitate efficient operations?
A. Designing web pages
B. Formatting spreadsheets
C. Storing, retrieving, and managing data in a database
D. Managing system files and data stored in a database (2 marks)

37. People, structured procedures and raw or processed data are widely recognised and fundamental classifications of the core components that collectively constitute and define a complete and functional _____ within any organisation.
A. programming languages
B. elements of an information system
C. internet service providers
D. cloud storage platforms (2 marks)

38. Which category of information system is used by top-level executives for strategic decision-making?
A. Office Automation System
B. Executive Information System (EIS)
C. Processing System (TPS)
D. Database Management System (DBMS) (2 marks)

39. Which particular type of information system is predominantly designed to efficiently support and automate the routine, highly structured and day-to-day operational business activities that are essential for an organisations continuous functioning?
A. Executive Information System (EIS)
B. Decision Support System (DSS)
C. Transaction Processing System (TPS)
D. Expert System (2 marks)

40. What is a key feature of hybrid databases that bridge SQL and NoSQL systems?
    A. They only support cloud storage
    B. They require manual data indexing
    C. They remove the need for data models and support cloud storage
    D. They combine the flexibility of NoSQL with the structure of SQL (2 marks)

41. What is a common technique used for organising data to avoid redundancy?
    A. Fragmentation
    B. Normalisation
    C. Duplication
    D. Aggregation (2 marks)

42. Why is documenting business processes important?
    A. To ensure clarity, repeatability and compliance
    B. To make the processes more complex
    C. To reduce the number of employees
    D. To automate all functions (2 marks)

43. Which one of the following best describes virtual data integration?
    A. It requires physically moving data into a central repository
    B. It involves building complex ETL pipelines only
    C. It provides a unified view of data without physical consolidation
    D. It requires converting all data to NoSQL format by building a complex ETL (2 marks)

44. What is the purpose of aggregate functions in SQL?
    A. To modify table structures
    B. To group and summarize data
    C. To link two databases
    D. To increase query speed (2 marks)

45. What is a defining characteristic of in-memory databases?
    A. Data is stored in RAM for faster access
    B. Data is stored on magnetic tapes
    C. Data is only stored after the system shuts down
    D. Data requires manual entry (2 marks)

46. Which one of the following is not a basic set operation used in relational databases?
    A. Union
    B. Intersection
    C. Difference
    D. Transpose (2 marks)

47. Which file structure is commonly used to store database tables on disk?
    A. Text file
    B. Heap file
    C. Executable file
    D. Script file (2 marks)

48. Which one of the following best describes structured data?
    A. Data in a fixed format, like tables
    B. Data from social media platforms
    C. Data stored in audio files
    D. Images and videos (2 marks)

49. Which one of the following would be most aptly labelled a core or primary business process?
    A. Monthly payroll processes and computation of employee salaries
    B. The cleaning and housekeeping procedures within the office for its maintenance
    C. End-to-end order processing and fulfillment of customer purchases
    D. Scheduling staff retreats or holiday parties throughout the year (2 marks)

50. What is a nested subquery in SQL?
    A. A subquery written within another query
    B. A subquery that modifies the table structure
    C. A query that includes an ORDER BY clause
    D. A query that deletes records (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

WEDNESDAY: 23 April 2025. Afternoon Paper. **Time Allowed: 2 hours.**

This paper consists of fifty (50) Multiple Choice Questions. Answer ALL questions by indicating the letter (A, B, C or D) that represents the correct answer. Each question is allocated two (2) marks.

1. Which one of the following database languages is a procedural language?
   A. Domain relational calculus
   B. Tuple relational calculus
   C. Relational algebra
   D. Query language (2 marks)

   ANSWER: C

2. A functional dependency is a relationship between or among _____.
   A. entities
   B. rows
   C. attributes
   D. tables (2 marks)

   ANSWER: C

3. A correlation needs to be identified between the salary structure and policies sold made by Insurance agents in an organisation. Which one of the following data processing techniques would be most suitable?
   A. OLTP
   B. OLAP
   C. OLAM
   D. ROLAP (2 marks)

   ANSWER: A

4. The database design prevents some data from being stored due to _____.
   A. deletion anomalies
   B. insertion anomalies
   C. update anomalies
   D. selection anomalies (2 marks)

   ANSWER: C

5. Which one of these is **NOT** a data transformation strategy?
   A. Aggregation
   B. Normalisation
   C. Generalisation
   D. Compression (2 marks)

   ANSWER: D

6. The final step of the data mart implementation process is known as _____.
   A. designing
   B. accessing
   C. managing
   D. populating (2 marks)

ANSWER: C

7. A database index is a data structure that improves the speed of data retrieval operations on a database table at the cost of additional writes.
   A. True
   B. False (2 marks)

ANSWER: A

8. In object-based databases an extent refers to which of the following?
   A. A keyword that indicates that the subclass inherits from a superclass
   B. A keyword that indicates that the superclass inherits from a subclass
   C. The set of all instances of a class within a database
   D. Only one instance of a class within a database (2 marks)

ANSWER: C

9. In data mining, the slice operation performs a selection on _____.
   A. one dimension
   B. two dimension
   C. three dimension
   D. multi dimension (2 marks)

ANSWER: A

10. 5NF is designed to cope with _____.
   A. transitive dependency
   B. join dependency
   C. multi valued dependency
   D. partial dependency (2 marks)

ANSWER: B

11. In the structure Student (ID, name, dept name, tot_cred), which attribute(s) would form the primary key?
   A. Name
   B. Dept
   C. Tot_cred
   D. ID

(2 marks)

ANSWER: D

12. Given that class Manager extends Employee, which one of the following statements is true?
   A. Manager is a concrete class and a superclass
   B. Manager is a concrete class and a subclass
   C. Manager is an abstract class and a superclass
   D. Manager is an abstract class and a subclass (2 marks)

ANSWER: B

13. Which one of these refers to an unordered collection of elements that may contain duplicates?
   A. Set
   B. Bag
   C. List
   D. Dictionary (2 marks)

ANSWER: B

14. The _____ operation allows the combining of two relations by merging pairs of tuples, one from each relation, into a single tuple.
A. Select
B. Join
C. Union
D. Intersection (2 marks)

ANSWER: B

15. What are the desirable properties of a decomposition during normalisation?
A. Partition constraint
B. Dependency preservation
C. Redundancy
D. Security (2 marks)

ANSWER: B

16. Which one of these is **NOT** a characteristic of a relational database transaction?
A. Atomicity
B. Isolation
C. Availability
D. Durability (2 marks)

ANSWER: C

17. To include integrity constraint in an existing relation we use _____.
A. create table
B. modify table
C. alter table
D. drop table (2 marks)

ANSWER: C

18. The _____ operator takes the results of two queries and returns only rows that appear in both result sets.
A. union
B. intersect
C. difference
D. projection (2 marks)

ANSWER: A

19. Data integrity constraints are used to _____.
A. control who is allowed access to the data
B. ensure that duplicate records are not entered into the table
C. improve the quality of data entered for a specific property
D. prevent users from changing the values stored in the table (2 marks)

ANSWER: C

20. The _____ statement is used to confer authorisation in SQL.
A. access
B. confer
C. provide
D. grant (2 marks)

ANSWER: D

21. How is a relationship specified in the Object Definition Language (ODL)?
A. One direction starting with the first class
B. One direction starting with the second class
C. Neither direction
D. Both directions (2 marks)

ANSWER: D

22. XML technology is mainly for _____.
    A. integration of heterogeneous information systems
    B. integration of data for heterogeneous information systems
    C. presentation of business data
    D. specifying style rules for data presentation (2 marks)

ANSWER: C

23. Which type of databases are used for optimising data warehousing and OLAP?
    A. Network
    B. Relational
    C. Multidimensional
    D. Structural (2 marks)

ANSWER: C

24. Which one of these is **NOT** a data reduction strategy?
    A. Data generalisation
    B. Dimension reduction
    C. Data compression
    D. Data cube aggregation (2 marks)

ANSWER: A

25. A special marker that indicates an absent value that may exist but be unknown or that may not exist at all is known as _____.
    A. an empty tuple
    B. a new value
    C. a null value
    D. an old value (2 marks)

ANSWER: C

26. The process of discovering an ideal strategy for processing a query is known as _____.
    A. ultimate query processing
    B. query optimisation
    C. query management
    D. query costing (2 marks)

ANSWER: B

27. The data dictionary is considered to be a special type of table that can only be accessed and updated by the _____.
    A. compiler
    B. developer
    C. designer
    D. database system (2 marks)

ANSWER: D

28. The storage manager component that decided which data to cache in the main memory is known as the _____.
    A. buffer manager
    B. authorisation and integrity manager
    C. file manager
    D. transaction manager (2 marks)

ANSWER: A

29. Which one of the following is **NOT** a data warehouse application?
    A. Information processing
    B. Analytical processing
    C. Transaction processing
    D. Data mining (2 marks)

ANSWER: C

30. A collection of tables that represent both data and the relationships among data is known as _____.
    A. relational model
    B. entity relationship model
    C. object-based data model
    D. semi-structured data model (2 marks)

ANSWER: A

31. Consider a relation created using the SQL statement below: CREATE TABLE Employees (id INTEGER, name VARCHAR(20), salary INTEGER NOT NULL);

    Which one of the following insert statements will produce an error?
    A. Insert into employee values (1005,Steve,0);
    B. Insert into employee values (1002,PETERO,335);
    C. Insert into employee values (1007,Godfrey,);
    D. Insert into employee values (1003452, ,35699); (2 marks)

ANSWER: C

32. One can optimise a query plan by pushing a selection down an expression tree, but not by moving a selection up the tree.
    A. True
    B. False (2 marks)

ANSWER: B

33. Which one from the following statements **CANNOT** be considered as a business driver in information systems?
    A. Redesign of a business process
    B. Information security and privacy
    C. Proliferation of networks and the Internet
    D. Timely decision making (2 marks)

ANSWER: C

34. Which of the following constraint must be used in the employees table to include the attributes whose rows must always have some value?
    A. Null
    B. Not null
    C. Unique
    D. Distinct (2 marks)

ANSWER: B

35. In OLAP cubes the data (measures) are categorised by _____.
    A. length
    B. angles
    C. dimensions
    D. breadth (2 marks)

ANSWER: C

36. During _____ the designer reviews the schema to ensure that it meets all the functional requirements.
    A. initial planning
    B. conceptual design
    C. execution design
    D. control design (2 marks)

ANSWER: B

37. Select the correct statement.
A. A data warehouse view allows the selection of the relevant information necessary for the data warehouse
B. The business query view allows the selection of the relevant information necessary for the data warehouse
C. The business query view exposes the information being captured, stored and managed by operational systems
D. The data source view exposes the information being captured, stored and managed by operational systems
(2 marks)

ANSWER: D

38. Domain constraints and referential integrity constraints are special forms of _____.
A. assertions
B. authorisations
C. integrity
D. consistency (2 marks)

ANSWER: A

39. Business process reengineering is also known as _____.
A. business process change management
B. business redevelopment
C. business design
D. business improvement (2 marks)

ANSWER: A

40. The goal of _____ is to generate a set of relation schemas which will allow storage of information without unnecessary redundancy.
A. normalisation
B. assertion
C. integration
D. association (2 marks)

ANSWER: A

41. Mutual exclusion implies that _____.
A. if a process is executing in its critical section, then no other process must be executing in their critical sections
B. if a process is executing in its critical section, then other processes must be executing in their critical sections
C. if a process is executing in its critical section, then all the resources of the system must be blocked until it finishes execution
D. if a process is executing in its critical section, then all the resources of the system must be released to other processes (2 marks)

ANSWER: A

42. Which of the following is the oldest database model?
A. Relational
B. Hierarchical
C. Object data model
D. Network (2 marks)

ANSWER: D

43. Concurrent access to shared data is most likely to result in _____.
A. data insecurity
B. data inconsistency
C. data redundancy
D. data optimisation (2 marks)

ANSWER: B

44. Which one of the following keys can be used to uniquely identify a row in a table?
A. Secondary key
B. Alternate key
C. Foreign key
D. Candidate key (2 marks)

ANSWER: D

45. The correctness and completeness of the data in a database is referred as _____.
A. data independence
B. data constraint
C. data integrity
D. data accuracy (2 marks)

ANSWER: C

46. The process of selecting the data storage and data access characteristics of the database is known as _____.
A. logical database design
B. physical database design
C. database performance tuning
D. database evaluation (2 marks)

ANSWER: B

47. A system where operations like data extraction, transformation and loading operations are executed is known as _____.
A. data staging
B. data integration
C. ETL
D. load balancing (2 marks)

ANSWER: A

48. The characteristic of "Velocity" in Big Data represents speed of _____.
A. input data generation
B. individual machine processors
C. storing and processing data
D. storing information (2 marks)

ANSWER: C

49. The relationship between "DEPARTMENT" and "EMPLOYEE" is a _____ relationship.
A. one-to-one
B. one-to-many
C. many-to-many
D. many-to-one (2 marks)

ANSWER: B

50. When a sequence of primitive evaluations is put together during query optimisation, they form a _____.
A. query execution plan
B. primitive execution plan
C. primitive evaluation plan
D. query sequence order (2 marks)

ANSWER: A

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 3 December 2024. Afternoon Paper. **Time Allowed: 2 hours.**

This paper consists of fifty (50) Multiple Choice Questions. Answer ALL questions by indicating the letter (A, B, C or D) that represents the correct answer. Each question is allocated two (2) marks.

1. There are many different types of failure that can affect database processing, each of which has to be dealt with in a different manner. Which one of the following reasons is a possible cause a failure in databases?
   A. System updates
   B. Storage medium failure
   C. Application user errors
   D. Non-volatile storage (2 marks)

2. Which one of the following facilities is **NOT** provided by DBMS to assist with data recovery?
   A. Backup mechanism
   B. Logging facilities
   C. A checkup facility
   D. A recovery manager (2 marks)

3. Online Analytical Processing (OLAP) enhances data analysis and reporting by _____.
   A. providing real-time data processing capabilities for transactional tasks
   B. allowing users to perform multidimensional analysis on large data sets
   C. minimising data storage requirements for historical data
   D. simplifying data entry processes for operational databases (2 marks)

4. The operation of moving from finer-granularity data to a coarser granularity by means of aggregation is called _____.
   A. rollup
   B. drill down
   C. dicing
   D. pivoting (2 marks)

5. Which one of the following sets is **BEST** known as a set of entities of the same type that share same properties or attributes?
   A. Relation set
   B. Tuples
   C. Entity set
   D. Entity Relation model (2 marks)

6. Which one of the following statements is **FALSE** about data visualisation?
   A. Data visualisation does not enhance the accessibility, understanding or usability of complex data
   B. Data visualisation communicates information clearly and effectively through the use of graphics like tables and charts
   C. Data visualisation simplifies the analysis of large data sets for users
   D. Data visualisation enhances the accessibility, understanding and usability of complex data (2 marks)

7. Which one of the following methods shows hierarchical data in a nested format?
   A. Population pyramids
   B. Scatter plots
   C. Treemaps
   D. Area charts (2 marks)

8. In a Database Management System (DBMS), which is the constraint that determines the relation between one attribute and another and helps to maintain the quality of data in the database?
   A. Functional dependency
   B. Transitive dependency
   C. Relational dependency
   D. Partial dependency (2 marks)

9. Which is the subset of SQL commands that has the ability to query data, as well as insert, delete and alter tuples?
   A. Transaction Control Language (TCL)
   B. Data Control Language (DCL)
   C. Data Definition Language (DDL)
   D. Data Manipulation Language (DML) (2 marks)

10. Which one of the following integrity constraints will help to maintain data accuracy and prevent invalid data from being entered into specific fields?
   A. Referential integrity constraint
   B. Entity integrity constraint
   C. Domain integrity constraint
   D. Primary key integrity constraint (2 marks)

11. Identify the type of data structure that is used to quickly locate and access data in database table.
   A. Indexing
   B. Hashing
   C. Modelling
   D. Querying (2 marks)

12. Which one of the following applications is an open-source extension of the part of the UML system dealing with profiles?
   A. XMI
   B. XML
   C. SysML
   D. UML (2 marks)

13. Which one of the following tools is **NOT** a data warehouse component?
    A. Central database
    B. ETL tools
    C. Metadata
    D. Retrieval tools (2 marks)

14. The "All or nothing rule" as a property of a transaction is referred to as _____.
    A. atomicity
    B. consistency
    C. isolation
    D. durability (2 marks)

15. Which one of the following is the special DBMS table that contains a description of all the database transactions executed by a DBMS?
    A. Transaction table
    B. Transaction log
    C. Transaction schedule
    D. Transaction lock (2 marks)

16. In concurrency control, the type of lock that exists when access to a data item is specifically reserved for the transaction that locked the object is known as _____.
    A. shared lock
    B. concurrent lock
    C. read lock
    D. exclusive lock (2 marks)

17. Which one of the following is a key feature of Distributed Database Management System (DDBMS)?
    A. Centralised data storage for all transactions
    B. Data distribution across multiple locations
    C. Uniformity in database access methods
    D. Single point of failure for data management (2 marks)

18. The ANSI-SPARC three-level architecture for a DBMS provides a reference architecture for a centralised DBMS. Which one of the following is a schema in the reference architecture?
    A. A set of global internal schemas
    B. A global logical schema
    C. Fragmentation schema
    D. A global physical schema (2 marks)

19. Which one of the following statements gives an objective of structured query language (SQL)?
    A. Create the database and relation structures
    B. Perform complex data management tasks
    C. Perform simple queries only
    D. Perform complex queries only (2 marks)

20. Which one of the following SQL clauses will list the attributes that are supposed to appear in the results table?
    A. SELECT
    B. FROM
    C. WHERE
    D. ORDER BY (2 marks)

21. Which one of the following components forms a query processor?
    A. DDL Assembler
    B. DML Compiler
    C. DDL Compiler
    D. Search Engine (2 marks)

22. Which of the following listed steps, is the second step of the knowledge discovery in databases (KDD) process?
    A. Goal-setting and application understanding
    B. Data cleaning and preprocessing
    C. Data transformation
    D. Data selection and integration (2 marks)

23. Which one of the following SQL aggregate functions will return the number of values in a specified column?
    A. MIN
    B. COUNT
    C. SUM
    D. MAX (2 marks)

24. The join operation which combines data from two tables by forming pairs of related rows where the matching columns in each table have the same value is referred to as _____.
    A. outer join
    B. inner join
    C. left inner join
    D. left outer join (2 marks)

25. The process of identifying the object and relationships between them is called _____.
    A. data flow diagram
    B. data relationship
    C. entity life history
    D. data modeling (2 marks)

26. Which one of the following terms **BEST** describes non-programmed decisions which are not fully guided by rules?
    A. Unstructured decisions
    B. Semi structured decisions
    C. Structured decisions
    D. Simple decisions (2 marks)

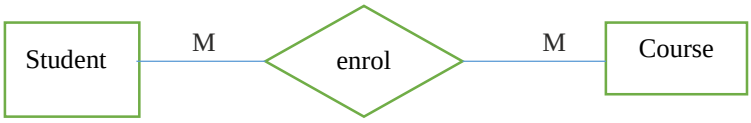
27. The characteristic of information that deals with the objectivity with which it is presented is referred to as _____.
    A. timeliness
    B. reliability
    C. relevance
    D. accuracy (2 marks)

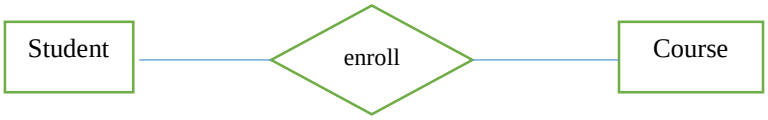
28. Which one of the following types of information systems reproduces the performance of one or more professionals?
A. Transaction processing system
B. Decision support system
C. Expert system
D. Management information system (2 marks)

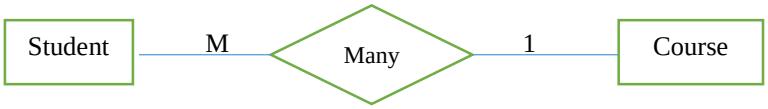
29. The type of information that enables middle level managers to make decisions is referred to as _____.
A. tactical information
B. strategic information
C. operational information
D. expert information (2 marks)

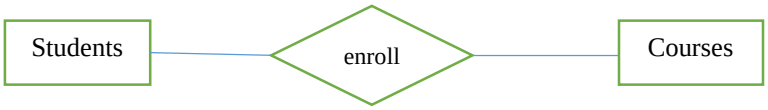
30. The following statement shows the relationship between student and course entities:
Student enrolls for only one course, but a course can have many students.

Which of the diagrams below represents this relationship?

A.


B.


C.


D.


(2 marks)

31. Which one of the following statements aligns with ALTER TABLE command functionality in SQL?
A. It is used to delete data from an existing table
B. It is used to modify the structure of an existing table
C. It is used to retrieve records from a database table
D. It is used to create a new table in the database (2 marks)

32. Which one of the following expressions can be used to query a native XML database?
A. XPath expressions
B. XMLPath expressions
C. XML expressions
D. XTML expressions (2 marks)

33. Which one of the following methodologies describes the data mining methodology that includes descriptions of the typical phases of a project and the tasks involved with each phase?
    A. RAD methodology
    B. Waterfall methodology
    C. CRISP-DM methodology
    D. Prototyping methodology (2 marks)

34. Which one of the following terms refers to the radical redesign of business processes by organisation in order to achieve a major breakthrough?
    A. Business process engineering
    B. Business process reengineering
    C. Business process improvement
    D. Business process modelling (2 marks)

35. Which one of the following terms will make complex data more accessible, understandable and usable?
    A. Data scrubbing
    B. Data analysis
    C. Data visualisation
    D. Data mining (2 marks)

36. Which one of the following terms is **NOT** a function of a data warehouse?
    A. Data cleaning
    B. Data integration
    C. Data extraction
    D. Data offloading (2 marks)

37. Which one of the following statements concerning Object-Oriented databases is **TRUE**?
    A. They store data in a tabular format like relational databases
    B. They support inheritance, encapsulation and polymorphism
    C. They are only used for handling large transactional data sets
    D. They limit data storage to structured data types only (2 marks)

38. Which one of the following terms should an SQL query with location transparency specify in distributed databases?
    A. Fragments
    B. Locations
    C. Local formats
    D. Inheritance (2 marks)

39. A technique for processing a join between two tables that are stored sites is known as _____.
    A. natural join
    B. left outer join
    C. cross join
    D. semi-join (2 marks)

40. In relation to XML Schema data types, which of the following statements is **TRUE**?
A. XML Schema supports only string and numeric data types
B. XML Schema cannot validate date or time data types
C. XML Schema defines simple and complex data types for elements
D. XML Schema only supports predefined data types, no custom types (2 marks)

41. A query that is written under the WHERE clause of another SQL query is referred to as _____.
A. nested query
B. duplicated query
C. super-query
D. secondary query (2 marks)

42. In a Database Management System (DBMS), which is the constraint that determines the relation between one attribute and another and helps to maintain the quality of data in the database?
A. Functional dependency
B. Transitive dependency
C. Relational dependency
D. Partial dependency (2 marks)

43. The hashing technique that allows a hash file either to expand or to shrink dynamically is known as _____.
A. non-linear hashing
B. external hashing
C. extendible hashing
D. linear hashing (2 marks)

44. Which one of the following statements **BEST** describes how new information systems can result in legal gray areas?
A. They work with networked, digital data, which are more difficult to control than information stored manually
B. They result in new situations that are not covered by old laws
C. They are implemented by technicians rather than managers
D. They are created from sets of logical and technological rules rather than social or organisational mores (2 marks)

45. Which one of the following systems is basically defined as a systematic integration of hardware and software for capturing, storing, displaying, updating manipulating and analysing spatial data?
A. Geographical Information System (GIS)
B. Global Positioning System (GPS)
C. Executive Information System (EIS)
D. Knowledge Work System (KWS) (2 marks)

46. Which SQL statement is used to add new records to a table?
A. ADD
B. CREATE
C. INSERT
D. UPDATE (2 marks)

47. The process of finding a good strategy for processing a query is called?
A. Query optimisation
B. Query processing
C. Query management
D. Query cost (2 marks)

48. Which one of the following can be classified as a function of a DBMS?
A. Increasing data redundancy and inconsistency
B. Reducing data security
C. Data transformation and presentation
D. Ensuring data dependence (2 marks)

49. Key performance indicators are quantifiable measures of performance over time for specific strategic objectives. An intern listed the following elements as measures of performance:

(i) Only show data points critical for decision making avoid overload
(ii) Disable users to restrict interaction with charts
(iii) Illustrate progress over time clearly
(iv) Notifications and alerts are not necessary when KPIs fall below/above targets

Identify key elements to include in a KPI dashboard.
A. (i) and (ii)
B. (i) and (iii)
C. (i), (ii) and (iv)
D. (i), (iii) and (iv) (2 marks)

50. Which of the following is a key characteristic of big data?
A. Availability
B. Frequency
C. Compatibility
D. Variety (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 20 August 2024. Afternoon Paper. **Time Allowed: 2 hours.**

This paper consists of fifty (50) Multiple Choice Questions. Answer ALL questions by indicating the letter (A, B, C or D) that represents the correct answer. Each question is allocated two (2) marks.

1. What is the primary purpose of data mining in business intelligence?
   A. Extracting patterns and knowledge from large datasets
   B. Capturing, storing and managing vast amounts of data
   C. Ensuring data integrity and security
   D. Querying data for business reporting (2 marks)

2. Locking mechanism prevent conflicts between transactions accessing the same data simultaneously in a database system by_____.
   A. allowing transactions to read but not write concurrently
   B. implementing time-stamped locks for all operations
   C. using optimistic concurrency control
   D. using shared locks for read operations and exclusive locks for write operations (2 marks)

3. Which one of the following in a database refers to a field with no value?
   A. Missing value
   B. Null value
   C. Tuple
   D. Entity (2 marks)

4. Which one of the following can be used in SQL to add, delete or modify columns in an existing table?
   A. Update table
   B. Set table
   C. Modify table
   D. Alter table (2 marks)

5. Which software serves as an interface between the database and end-users or application programs, ensuring data consistency, integrity and security?
   A. Operating System
   B. Middleware
   C. Database Management System
   D. Network Interface (2 marks)

6. Which one of the following schema is **MOST** beneficial for simplified querying and reporting in a data warehouse?
   A. Star Schema
   B. Snowflake Schema
   C. Galaxy Schema
   D. Constellation Schema (2 marks)

7. The join operation that performs an equijoin over all the attributes in the two relations that have the same name is referred to as _____.
   A. outer join
   B. theta join
   C. natural join
   D. semi join (2 marks)

8. Which one of the following is **NOT** a process in data mining?
   A. Data exploration
   B. Data transformation
   C. Data archaeology
   D. Knowledge extraction (2 marks)

9. The theoretical language with operations that work on one or more relations to define another relation without changing the original relation is referred to as _____.
   A. database algebra
   B. boolean algebra
   C. set difference algebra
   D. relational algebra (2 marks)

10. Which one of the following is relational algebra operation that will provide the names of students who have bought books and pencils?
   A. πStudent(Books) + πStudent (Pencils)
   B. πStudent(Books) - πStudent (Pencils)
   C. πStudent(Pencils) + πStudent (Books)
   D. πStudent(Pencils) - πStudent (Books) (2 marks)

11. What component of a Databases Management System (DBMS) is responsible for analysing and converting SQL statements into executable instructions?
   A. Query Optimiser
   B. Data Storage Manager
   C. Transaction Processor
   D. Database Engine (2 marks)

12. Which one of the following is the functional dependency rule which states that if X is a set of attributes and Y is its subset, then X holds a value of Y.
   A. Augmentation rule
   B. Reflexive rule
   C. Transitivity rule
   D. Functional rule (2 marks)

13. Geographic Information System (GIS) useful in _____.
   A. inventory management
   B. real-time stock trading
   C. spatial data mapping
   D. document version control (2 marks)

14. What is the main goal of a DBMS's backup and recovery facilities?
   A. Ensuring data availability and durability
   B. Enhancing query performance by caching data
   C. Securing data by encrypting it
   D. Reducing redundancy in stored data (2 marks)

15. What type of information does a data dictionary store in a DBMS?
   A. Security credentials of database users
   B. Metadata about the database structure
   C. Information for query optimisation
   D. Transaction processing data (2 marks)

16. What is the primary function of transaction processing systems (TPS) in business?
   A. Supporting management decision-making
   B. Analysing large datasets for trends
   C. Recording day-to-day business dealings
   D. Managing customer relationships (2 marks)

17. Which one of the following is **NOT** a step of decomposition in a DBMS?
   A. Catabolism
   B. Scrubbing
   C. Fragmentation
   D. Leaching (2 marks)

18. In the context of databases, what is a tuple?
    A. A row in a table
    B. A column in a table
    C. A primary key
    D. An index (2 marks)

19. The representation of information and data using charts, graphs, maps and other visual tools is referred to as _____.
    A. data analysis
    B. data prediction
    C. data visualisation
    D. data verification (2 marks)

20. What is the main advantage of using an indexed column in a database query?
    A. Reduces the amount of data storage needed
    B. Speeds up data retrieval
    C. Simplifies query syntax
    D. Ensures data integrity (2 marks)

21. To which category of information systems does an Expert System belong?
    A. Knowledge Management System (KMS)
    B. Decision Support System (DSS)
    C. Transaction Processing System (TPS)
    D. Management Information System (MIS) (2 marks)

22. The web language that displays content, given in a text-based document, in a graphical form in the browser is known as?
    A. XML
    B. XPath
    C. Xtensible Stylesheet Language
    D. HTML (2 marks)

23. Which one of the following is the transaction property which states that a transaction should be executed entirely or should **NOT** be executed at all?
    A. Durability
    B. Consistency
    C. Atomicity
    D. Isolation (2 marks)

24. Which one of the following is **NOT** a Knowledge Discovery in Databases (KDD) technique?
    A. Data mining
    B. Data reporting
    C. Data transformation
    D. Pattern evaluation (2 marks)

25. How is data normalisation beneficial in designing a relational database?
    A. It increases redundancy for better performance
    B. It reduces data duplication
    C. It enhances the speed of data retrieval by de-normalising
    D. It removes the need for indexes (2 marks)

26. What is a major difference between SQL and NoSQL databases?
    A. SQL databases are better for hierarchical data whereas NoSQL databases are better for tabular data
    B. SQL databases are schema-less whereas NoSQL databases have a fixed schema
    C. SQL databases use structured query language whereas NoSQL databases can handle unstructured data
    D. SQL databases store data in key-value pairs whereas NoSQL databases store data in relational tables (2 marks)

27. What is the role of a data steward professional in data management?
    A. Ensuring data quality and compliance
    B. Writing database queries
    C. Creating visualisations
    D. Managing network security (2 marks)

28. Which one of the following data can be classified as unstructured data?
    A. Spreadsheet data
    B. Database records
    C. Text documents
    D. Tables and charts (2 marks)

29. Which one of the following **BEST** describes the characteristics of the information that is required by the lowest level executives in an organisation?
    A. It is highly summarised and relevant to the long term
    B. It is highly detailed and relevant to the short term
    C. It is highly detailed and relevant to the long term
    D. It is highly summarised and relevant to the short term (2 marks)

30. Which one of the following is **NOT** a drawback of shared/exclusive locks in concurrency control?
    A. They do not guarantee serialisability of schedules on their own
    B. They are not optimised for speedy transactions
    C. They are usually prone to hacking
    D. Their performance overhead is not negligible (2 marks)

31. What does the "Isolation" property in ACID transactions ensure?
    A. Transactions are executed completely or not at all
    B. Intermediate transaction results are hidden from other transactions until they are completed
    C. Database remains in a consistent state before and after the transaction
    D. Completed transactions are permanently recorded (2 marks)

32. Which one of the following statements about Object-Oriented databases is **TRUE?**
    A. Object-oriented databases are more adapt at handling structures (analytical) data than relational databases
    B. Object-oriented databases do not store computational instructions in the same place as the data
    C. Objects in an object-oriented database contain only data
    D. Object-oriented databases store more types of data than relational databases and access that data faster (2 marks)

33. Which one of the following is a type of database where the data is stored on a local hard drive or server but the information is available online?
    A. Centralised database
    B. Network database
    C. Cloud database
    D. NoSQL database (2 marks)

34. What does data integrity contribute to an information system?
    A. Secure access
    B. Prevents unauthorised access
    C. Ensures accuracy and consistency
    D. Essential for reports (2 marks)

35. The Online Analytical Processing (OLAP) operation that allows a user to zoom in on the data cube is called?
    A. Dice
    B. Drill down
    C. Slice
    D. Rollup (2 marks)

36. Which one of the following is **NOT** a source of data for the data warehouse?
    A. Mainframe operational data held in first generation hierarchical and network databases
    B. Departmental data held in proprietary file systems
    C. Public data held on workstations and public servers
    D. External systems such as the Internet, commercially available databases (2 marks)

37. What type of database architecture has nodes acting as both clients and servers?
    A. Distributed
    B. Peer-to-peer
    C. Client-server
    D. Multi-tier (2 marks)

38. Which one of the following is the type of Decision Support System (DSS) that provides factual and specialised solutions to situations using stored facts, procedures, rules or interactive decision-making structures?
A. Model driven
B. Communication driven
C. Knowledge driven
D. Document driven (2 marks)

39. The document that explains the actions that should be taken before, during and after unexpected events and situations is known as _____.
A. disaster recovery plan
B. business continuity plan
C. backup continuity plan
D. document continuity plan (2 marks)

40. The second step of the data warehouse implementation procedure requires the formulation of the warehouse strategy. Which of the following is **NOT** an activity of this process?
A. Assessing data requirements
B. Determining data sources
C. Defining integration approaches
D. Evaluating data integrity (2 marks)

41. A decision that is made by a database technician in an organisation using only documented rules is referred to as _____.
A. structured decision
B. unstructured decision
C. complete decision
D. semi structured decision (2 marks)

42. Which Structured Query Language (SQL) clause is used to filter rows from a result set?
A. GROUP BY
B. ORDER BY
C. WHERE
D. HAVING (2 marks)

43. Which one of the following can be used in Structured Query Language (SQL) to add, delete or modify columns in an existing table?
A. Update table
B. Set table
C. Modify table
D. Alter table (2 marks)

44. Which one of the following is a disadvantage of enterprise resource planning (ERP)?
A. It creates commonality of databases
B. It increases communications and collaboration worldwide
C. It helps integrate multiple sites and business units
D. It requires major changes in the company and its processes to implement (2 marks)

45. How does a Management Information System (MIS) differ from an Executive Support System (ESS) in terms of user focus?
A. MIS focuses on middle management; ESS focuses on top-level executives
B. MIS focuses on strategic decisions; ESS focuses on routine transactions
C. MIS provides unstructured information; ESS provides structured reports
D. MIS is for top management; ESS is for operational staff (2 marks)

46. The main purpose of a data mart is to _____.
A. to manage daily transactions
B. to tailor data for a particular business line in data warehousing
C. to provide a backup of the data warehouse and data restoration
D. to process and transform raw data into useful information (2 marks)

47. Which one of the following is **NOT** an advantage of the Unified Modelling Language (UML)?
    A. It allows different software developers to work on the same project.
    B. It provides for a more efficient design process
    C. It ensures data integrity.
    D. It helps identify potential problems early in the design process (2 marks)

48. Which one of the following is **NOT** an entity relationship (ER) design issue?
    A. Choosing entity set vs. attributes
    B. Choosing attribute set vs. relationship sets
    C. Choosing entity set vs. relationship sets
    D. Placing relationship attributes (2 marks)

49. Which one of the following is **NOT** a DBMS component?
    A. Data access language
    B. Hardware
    C. Data language
    D. Software (2 marks)

50. Which one of the following is a relational database design aggregate function that returns the number of rows in a set?
    A. Sum()
    B. Avg()
    C. Count()
    D. Max() (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 23 April 2024. Afternoon Paper. **Time Allowed: 2 hours.**

Answer ALL questions by indicating the letter (A, B, C or D) that represents the correct answer. This paper is made up of fifty (50) Multiple Choice Questions. Each question is allocated two (2) marks.

1. In the context of data warehousing, what is the purpose of a "star schema" in data modeling?
   A. To organise data into a hierarchical structure
   B. To model data as interconnected nodes in a network
   C. To represent complex relationships using multiple tables in data warehousing systems
   D. To simplify querying by using a central fact table surrounded by dimension tables (2 marks)

2. Which component of the 2-tier DBMS architecture will support the execution of user interfaces and application programs?
   A. Client
   B. Server
   C. Database
   D. Multiplier (2 marks)

3. The system software located between the user and the operating system, used to organise and store data, access and maintains data efficiently is called.
   A. Operating system
   B. Kernel
   C. DBMS
   D. Application Software (2 marks)

4. What is the difference between data mining and data warehousing?
   A. Data mining is the process of storing and managing data, while data warehousing is the extraction of insights from data
   B. Data mining is the extraction of insights from data, while data warehousing is the process of storing and managing data
   C. Data mining and data warehousing are synonymous terms
   D. Data mining and data warehousing have no relationship (2 marks)

5. Which one of the following is **NOT** a functionality provided by DBMS software?
   A. Data independence
   B. Data validations
   C. Data integrity checks
   D. Backup and restore

6. Which one of the following characteristics of information implies that it should be free of distortion and bias?
   A. Accuracy
   B. Reliability
   C. Consistency
   D. Availability (2 marks)

7. In the DIKW pyramid, what level represents synthesised information from data?
   A. Data
   B. Knowledge
   C. Wisdom
   D. Information (2 marks)

8. Which one of the following statements about a composite key is **TRUE**?
   A. It is as key that is the same as a primary key
   B. It is a key cannot be used for indexing
   C. It is a key that is not unique
   D. It is a key made up of multiple attributes (2 marks)

9. Which component of DBMS architecture is responsible for translating SQL queries into executable actions?
   A. Query Optimiser
   B. Data Storage
   C. Database Engine
   D. Transaction Manager (2 marks)

10. A decision that is made by a head of department in an organisation using documented rules and experience gained over time is referred to as _____.
   A. Unstructured decision
   B. Complete decision
   C. Structured decision
   D. Semi structured decision (2 marks)

11. What is the purpose of the data dictionary in a DBMS?
   A. It stores the database users' security credentials
   B. It contains metadata about the database structure
   C. It manages query optimisation
   D. It handles transactions processing (2 marks)

12. Which one of the following is an example scenario where a Geographic Information System (GIS) would be beneficial?
   A. Analysing customer demographics for targeted marketing
   B. Tracking sales transactions in a retail store
   C. Managing employee payroll information
   D. Generating financial reports for quarterly reviews (2 marks)

13. What is the primary purpose of the backup and recovery facility in a DBMS?
   A. To create duplicate copies of data
   B. To prevent unauthorised access to the database
   C. To restore data to a consistent state after a failure
   D. To optimise query performance (2 marks)

14. Which one of the following shows the relationship between smaller and larger components in a database?
   A. Data mart
   B. Data hierarchy
   C. Data independence
   D. Data integrity (2 marks)

15. Which one of the following is **NOT** an example of database application software?
   A. Oracle
   B. Paradox
   C. SQLite
   D. Ami Pro (2 marks)

16. Which one of the following is a characteristic of a distributed database?
   A. Data storage model that organises data in a hierarchical structure
   B. Data can only be accessed during specific hours
   C. Data is stored in a flat file format
   D. Data is spread across multiple locations or servers (2 marks)

17. Which one of the following refers to a valid set of values for an attribute?
    A. Key constraints
    B. Domain constraints
    C. Referential integrity constraints
    D. Entity constraint (2 marks)

18. A company hires out workers as they need to. Workers in the town stay in lodgings. A lodging may have many workers in it. We are only concerned with the workers' current lodging. Workers possess certain skills such as 'Tree Surgery' and 'Garden Design'. They may have more than one skill. How many entities will this statement generate in an ERD?
    A. 5
    B. 3
    C. 4
    D. 2 (2 marks)

19. What is the purpose of a data mart in the context of data warehousing?
    A. To manage transactional data
    B. To store raw and unstructured data for data analysis and reporting
    C. To store, secure and manage data from a specific business unit
    D. To perform complex data transformations (2 marks)

20. In the context of information systems, what does the term "accuracy" refer to?
    A. Relevance of information
    B. Consistency of measurements
    C. Completeness of information
    D. Correctness of information (2 marks)

21. Which one of the following statements **BEST** describes business process improvement?
    A. The act of recreating a core business process with the goal of improving product output, quality or reducing costs
    B. Discipline that uses various methods to discover, model, analyse, measure, improve and optimise business processes
    C. Management practice used to improve the efficiency and effectiveness of business processes by discovering, mapping, documenting, analysing and redesigning of processes
    D. The development and implementation of new, unique concepts supporting an organisation's financial viability, including its mission (2 marks)

22. What category does an Expert System belong to in information systems?
    A. Knowledge Management System (KMS)
    B. Decision Support System (DSS)
    C. Management Information System (MIS)
    D. Executive Support System (ESS) (2 marks)

23. Which one of the following credentials **MUST** be provided by users connecting using SQL Server Authentication every time that they connect?
    A. Username
    B. Password
    C. User ID
    D. User authorisation (2 marks)

24. Differentiate between a "Management Reporting System" (MRS) and an "Executive Support System" (ESS).
    A. MRS focuses on strategic decisions, while ESS focuses on operational decisions
    B. MRS deals with routine transactions, while ESS deals with unstructured decisions
    C. MRS supports middle-level management, while ESS supports top-level management
    D. MRS is software-based, while ESS is hardware-based (2 marks)

25. How would you apply the concept of data normalisation in designing a relational database?
    A. Store redundant data to improve query performance
    B. Organise data to minimise data duplication and dependency
    C. Use unstructured data for efficient storage
    D. Create separate databases for each department (2 marks)

26. In the SQL SELECT statement, which of the following clause will define the criteria in a query?
    A. SELECT
    B. ORDER BY
    C. WHERE
    D. INSERT (2 marks)

27. Identify a situation where an Enterprise Resource Planning (ERP) system would be most beneficial for an organisation.
    A. Managing daily employee schedules
    B. Tracking customer inquiries
    C. Creating ad-hoc reports for decision-makers
    D. Streamlining financial processes across departments (2 marks)

28. Which data type would be **MOST** suitable for storing an employee's age during a database design?
    A. String
    B. Integer
    C. Boolean
    D. Float (2 marks)

29. In the context of Business Intelligence (BI), what is the role of data visualisation?
    A. Data visualisation is immaterial in BI; only raw data is used for analysis
    B. Data visualisation is only used for data storage and not for analysis purposes
    C. Data visualisation is limited to numerical data and does not apply to other types of information for analysis purposes
    D. Data visualisation helps present complex data in a graphical format for better understanding and decision making (2 marks)

30. What is the primary distinction between SQL and NoSQL databases?
    A. SQL databases are schema-less, while NoSQL databases follow a strict schema
    B. SQL databases are relational, while NoSQL databases can be relational or non-relational
    C. SQL databases are primarily used for small datasets, while NoSQL databases are designed for large datasets
    D. SQL databases use a key-value storage model, while NoSQL databases use a tabular structure (2 marks)

31. Which data organisations technique follows First In, First Out (FIFO) principle?
    A. Array
    B. Linked list
    C. Stack
    D. Queue (2 marks)

32. What does the term “Big Data” refer to in the context of MIS?
    A. A collection of data without any similar redundancy
    B. Traditional relational databases
    C. Extremely large and complex datasets
    D. Data stored in a NOSQL table (2 marks)

33. What is the significance of the “Consistency” property in ACID?
    A. It ensures that transactions are executed in their entirety or not at all without failure
    B. It guarantees that once a transaction is committed, the database is left in a valid state
    C. It prevents multiple transactions from interfering with each other
    D. It maintains the durability of committed transactions (2 marks)

34. Which one of the following SQL commands will add a column Fees paid in the student relation?
    A.
    ```
    ALTER TABLE Student
    ADD Feespaid money(25);
    ```
    B.
    ```
    ALTER TABLE Student
    ADD Feespaid money;
    ```
    C.
    ```
    UPDATE TABLE Student
    ADD Feespaid money(25);
    ```
    D.
    ```
    UPDATE TABLE Student
    ADD Feespaid money;
    ```
    (2 marks)

35. What is the role of a data steward in data management?
    A. Ensuring data quality and compliance
    B. Writing complex database queries
    C. Creating data visualisations
    D. Managing network security (2 marks)

36. The process that involves the analysis and alteration of a database relation in order to get more concise and organised data structures is known as _____.
    A. Database design
    B. Query processing
    C. Normalisation
    D. Serialisation (2 marks)

37. What is the purpose of a data model in database design?
    A. To represent the physical storage of data in the database
    B. To perform real-time data analysis
    C. To secure database access
    D. To define the structure and relationships of data (2 marks)

38. Which one of the following relational algebra operations will result into tuples being present in one relation but not in the second relation?
    A. Projection operation
    B. Join operation
    C. Set difference operation
    D. Selection operation (2 marks)

39. What is the purpose of data cleansing in the context of data management?
    A. Encrypting sensitive data for security purpose
    B. Creating data backups for restorations
    C. Removing duplicate or inaccurate data
    D. Sorting data in alphabetical order for easier retrieval (2 marks)

40. Which one of the following is a deadlock prevention scheme?
    A. Wait-clear
    B. Wait-Die
    C. Wait-for-graph
    D. Wait-Block (2 marks)

41. Which one of the following refers to a general-purpose language in the field of software engineering that is intended to provide a standard way to visualise the design of a database?
    A. XML
    B. XTML
    C. HTML
    D. UML (2 marks)

42. Which one of the following is an emerging trend in Management Information Systems (MIS) related to data analytics?
    A. Static reporting
    B. Predictive analytics
    C. Manual data entry
    D. Traditional data warehousing (2 marks)

43. What is the difference between OLAP and OLTP?
    A. OLAP is designed for transactional processing, while OLTP is optimised for analytical queries
    B. OLAP focuses on real-time data processing, while OLTP is designed for analytical queries
    C. OLAP is used for complex data transformations, while OLTP handles routine transactional processing
    D. OLAP and OLTP are synonymous terms (2 marks)

44. Which one of the following statement about Object-Oriented databases is **FALSE**?
    A. Object-oriented databases store more types of data than relational databases and access that data faster
    B. Object-oriented databases are more adapt at handling structures (analytical) data than relational databases
    C. Object-oriented databases store computational instructions in the same place as the data
    D. Objects in an object-oriented database contain not only data but also methods for processing the data (2 marks)

45. Which one of the following is a key advantage of using a cloud-based database service?
    A. They do not rely on internet connectivity
    B. Vendor Lock-in
    C. Lower data security measures
    D. Reduced upfront infrastructure costs (2 marks)

46. In database terminology, what is a view?
    A. A virtual table based on the result of a SELECT query
    B. A physical storage location for data in an information system
    C. A unique identifier for each record in a table
    D. A type of database index (2 marks)

47. In a database, why is it beneficial to use indexing on columns frequently used in **WHERE** clauses?
    A. To reduce the storage space needed for the database in a database system
    B. To speed up the retrieval of rows that meet a specific condition
    C. To eliminate the need for primary keys in a database
    D. To prevent data corruption in a database system (2 marks)

48. Which one of the following is an example of unstructured data?
    A. Spreadsheet data
    B. Database records
    C. Text documents
    D. Tables and charts (2 marks)

49. The type of data and information mining process where data is searched, gathered and presented in a summarised format is referred to as _____.
    A. Data cleansing
    B. Data scrubbing
    C. Data clustering
    D. Data aggregation (2 marks)

50. Which one of the following is **NOT** a key component of a business continuity plan?
    A. Understanding risks and potential impact on the business
    B. Planning an effective response
    C. Defining roles and responsibilities
    D. Correcting errors that have occurred (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 5 December 2023. Afternoon Paper. **Time Allowed: 2 hours.**

Answer ALL questions by indicating the letter (A, B, C, or D) that represents the correct answer. This paper is made up of fifty (50) Multiple Choice Questions. Each question is allocated two (2) marks.

1. Which of the following **BEST** describes OLTP systems?
   A. They are designed for complex analytical queries
   B. They handle high volumes of short, simple transactions
   C. They store historical data for reporting and analysis
   D. They are optimised for data warehousing (2 marks)

2. Which of the following types of database is best suited for handling complex queries and associations between data entities?
   A. Relational database
   B. NoSQL database
   C. Hierarchical database
   D. Flat file database (2 marks)

3. Which of the following is **TRUE** about Object-Oriented databases?
   A. Object-oriented databases are more adapted to handling structures (analytical) data than relational databases
   B. Object-oriented databases store computational instructions in different places as the data
   C. Objects in an object-oriented database contain only data but no methods
   D. Object-oriented databases store more types of data than relational databases and access that data faster (2 marks)

4. Which of the following is **NOT** a functionality provided by DBMS software?
   A. Data integrity checks
   B. Backup and restore
   C. Data independence
   D. Data validations (2 marks)

5. The type of database that uses a parent-child model to store data is called:
   A. Object oriented database
   B. Cloud database
   C. Key value database
   D. Hierarchical databases (2 marks)

6. Which one of the following is **NOT** a best practice for successful data management?
   A. Build strong file naming and cataloging conventions
   B. Consider a variety of backup locations
   C. Ensure proper documentation of your data
   D. Ensure prioritisation of data experimentation and analytics (2 marks)

7. CRISP-DM process provides a structured approach to managing and executing data-driven projects from start to finish. What is the final phase in the CRISP-DM process?
   A. Data Preparation
   B. Data Understanding
   C. Evaluation
   D. Deployment (2 marks)

8. Which theory is concerned with the process of decomposing relations into smaller, more manageable relations while preserving information?
   A. Relational calculus theory
   B. Functional dependency theory
   C. Relational algebra theory
   D. Entity-relationship modeling theory (2 marks)

9. The Object-Relational Database Management System (ORDBMS) feature that enables users to write more efficient queries and reduce the amount of coding needed to access and retrieve data can **BEST** be described as:
   A. Greater flexibility
   B. Better performance
   C. Enhance scalability
   D. Improved data modelling (2 marks)

10. What is the result of the **INTERSECT** operation between two sets with no common elements?
   A. Empty set
   B. Union of the sets
   C. Cartesian product
   D. Cross join (2 marks)

11. What is inheritance in Structured Query Language (SQL) when referring to database design?
   A. A mechanism for inheriting database privileges
   B. A technique for creating new Structured Query Language functions
   C. A way to represent the relationship between parent and child tables
   D. A way to define primary keys in tables (2 marks)

12. Which of the following is a component of a DBMS that is responsible for ensuring data integrity and enforcing data constraints?
   A. Query language
   B. Data dictionary
   C. Transaction manager
   D. Indexing mechanism (2 marks)

13. Which of the following tasks in database management can be automated to enhance system performance and reduce manual intervention?
   A. Database design and schema development
   B. Data entry and data cleansing
   C. Backup and recovery operations
   D. Query optimisation and report generation (2 marks)

14. Which type of database systems is designed to bridge the gap between SQL and NoSQL databases, providing the flexibility to work with structured and unstructured data while maintaining relational database features?
   A. Relational Database Management System (RDBMS)
   B. NoSQL Database Management System
   C. Hybrid Database Management System (HDBMS)
   D. Cloud Database Management System (DBaaS) (2 marks)

15. What is the primary objective of a Business Continuity Plan (BCP)?
   A. To prevent all disruptions
   B. To minimise downtime of essential operations
   C. To maximise profits during disruptions
   D. To eliminate the need for insurance (2 marks)

16. The entity relationship diagram notation that uses the letter ‘m’ to indicate many on one side of the relationship is referred to as:
    A. Chen notation
    B. Crow’s foot notation
    C. UML notation
    D. Cardinal notation (2 marks)

17. Which component of database management is primarily responsible for organising data into files, managing storage, and ensuring efficient data retrieval?
    A. Query processor
    B. Query optimiser
    C. Transaction manager
    D. Storage manager (2 marks)

18. What does it mean for an attribute to be atomic in the context of relational databases?
    A. It cannot be divided into smaller components
    B. It always stores data that has a numeric value
    C. It is a primary key
    D. It is a foreign key (2 marks)

19. What does the term "data redundancy" refer to in data management?
    A. The practice of storing data in multiple locations for backup
    B. The unnecessary repetition of data within a database
    C. The process of encrypting sensitive data
    D. The organisation of data into hierarchical structures (2 marks)

20. What is the role of a data dictionary in a database system's storage and file structure?
    A. To store user data and records
    B. To manage and optimise query execution
    C. To provide a hierarchical structure for data
    D. To store metadata and schema information (2 marks)

21. What is the main advantage of using data visualisation in business intelligence?
    A. It reduces the need for data analysis and reporting
    B. It makes complex data more understandable and actionable
    C. It encrypts data for security purposes
    D. It replaces traditional reporting methods (2 marks)

22. What is the primary goal of achieving First Normal Form (1NF) in relational database design?
    A. Minimising the number of tables
    B. Ensuring that every attribute has a unique name
    C. Eliminating data redundancy
    D. Enforcing referential integrity (2 marks)

23. Which recovery technique keeps a log of committed transactions and their effects and periodically applies these changes to the database?
    A. Shadow paging
    B. Checkpointing
    C. Write-ahead logging
    D. Immediate update (2 marks)

24. Which of the following is the SQL aggregate function which returns the number of rows that matches a specified criterion?
    A. COUNT()
    B. AVG()
    C. MIN()
    D. MAX() (2 marks)

25. Which of the following describes the meanings and purposes of data elements within the context of a project or a database?
    A. Data mart
    B. Data dictionary
    C. Data warehouse
    D. Data entity (2 marks)

26. The set operation of two relations A and B which defines a relation that contains all the tuples of A or B, or both A and B with duplicate tuples being eliminated is referred to as:
    A. Set difference
    B. Natural join
    C. Union
    D. Cartesian product (2 marks)

27. Which software process model emphasizes collaboration, customer feedback, and small, cross-functional teams?
    A. Waterfall model
    B. Scrum model
    C. Spiral model
    D. Agile model (2 marks)

28. Which concurrency control technique prevents conflicts by locking data items that transactions want to access?
    A. Two-Phase Locking (2PL)
    B. Timestamp ordering
    C. Optimistic concurrency control
    D. Validation-based protocol (2 marks)

29. Which of the following **BEST** describes Platform as a Service (PaaS) in the context of databases in the cloud?
    A. A cloud service model that provides a platform and environment of virtual machines for running databases
    B. A cloud service model that offers a platform and environment for developing, deploying, and managing databases
    C. A cloud service model that stores data in a decentralised network of computers
    D. A cloud service model that offers database consulting and security services (2 marks)

30. What is the purpose of the ON clause in a SQL JOIN?
    A. It defines the order in which tables are joined
    B. It specifies the columns to be retrieved from each table
    C. It specifies the conditions for matching rows between tables
    D. It determines the sorting of the result set (2 marks)

31. What is a Star Schema in the context of data warehousing?
    A. A schema where all dimension tables are connected to a central fact table
    B. A schema where all dimension tables are interconnected with each other
    C. A schema used for storing binary data
    D. A schema used for OLTP systems (2 marks)

32. What is a “dirty page” in the context of recovery?
    A. A page that has been read but not yet written to the database
    B. A page that contains only clean data
    C. A page that has been modified but not yet written to the database
    D. A page that is no longer needed (2 marks)

33. The process of confirming that a user who is attempting to log in to a database is authorised to do so, and is only accorded the rights to perform activities that he or she has been authorised to do is known as:
    A. Database authorisation
    B. Database authentication
    C. Database evaluation
    D. Database accessibility (2 marks)

34. Which of the following is an example of a data visualisation tool commonly used for creating interactive dashboards?
A. Microsoft Word
B. Adobe Photoshop
C. Tableau
D. Notepad (2 marks)

35. Which of the following is **NOT** a query processing activity?
A. Query parsing
B. Query validation
C. Query optimising
D. Query planning (2 marks)

36. Which data storage structure is typically used for efficiently storing large text or binary data, such as documents or images, in a database system?
A. B-tree
B. Heap file
C. Large Object storage
D. Index (2 marks)

37. Which is the third stage of the knowledge discovery (KDD) process?
A. Data Transformation
B. Prediction and description
C. Preprocessing and cleansing
D. Choosing and creating a data set on which discovery will be performed (2 marks)

38. What is referential integrity in the context of database relationships?
A. A constraint that ensures that foreign keys have unique values
B. A constraint that ensures that primary keys are sequentially numbered
C. A constraint that ensures that relationships are properly documented
D. A constraint that ensures that data is consistently stored in the database (2 marks)

39. Which of the following is the type of data integration that facilitates communication between legacy systems and updated ones to expedite integration in a database?
A. Middleware data integration
B. Uniform access integration
C. Manual data integration
D. Application-based integration (2 marks)

40. Which of the following represents a many-to-many (M: M) relationship?
A. Student-to-University (Each student can attend multiple universities, and each university can have multiple students)
B. Person-to-Address (Each person has one address, and each address belongs to one person)
C. Employee-to-Manager (Each employee has one manager, and each manager can have multiple employees)
D. Author-to-Book (Each author can write multiple books, and each book can have multiple authors)
(2 marks)

41. Which SQL clause is used to filter rows in a SELECT statement?
A. FROM
B. WHERE
C. SELECT
D. GROUP BY (2 marks)

42. What type of information system is primarily used to analyse and support non-routine resolutions in an organisation?
A. Decision Support Systems (DSS)
B. Management Information Systems (MIS)
C. Office Information Systems (OIS)
D. Expert Systems (ES) (2 marks)

43. The type of XML database that maps XML data to a traditional database is referred to as:
    A. Native XML database
    B. XML-enabled database
    C. Volatile XML database
    D. Web based XML database (2 marks)

44. Which of the following is **NOT** a feature of Online Analytical Processing (OLAP)?
    A. It handles a large number of small transactions
    B. It handles large volumes of data with complex queries
    C. It is based on SELECT commands to aggregate data for reporting
    D. Data periodically refreshed with scheduled, long-running batch jobs (2 marks)

45. Which one of the following transactions ensures that the changes become permanent and are not lost, even in the event of a system crash in the context of ACID properties?
    A. Atomicity
    B. Consistency
    C. Isolation
    D. Durability (2 marks)

46. Which of the following is **NOT** a type of schema in a multidimensional data model?
    A. Star schema
    B. Snowflake schema
    C. Ring schema
    D. Fact Constellation schema (2 marks)

47. Which of the following is a common challenge in data warehouse implementation?
    A. Lack of data security
    B. Excessive real-time
    C. Difficulty in accessing historical data
    D. Limited storage capacity (2 marks)

48. Which level of the Data, Information, Knowledge and Wisdom (DIKW) pyramid represents the highest form of processed information?
    A. Data
    B. Information
    C. Knowledge
    D. Wisdom (2 marks)

49. What is the primary goal of Business Process Improvement (BPI)?
    A. To create more complex processes
    B. To reduce operational efficiency
    C. To streamline processes and enhance productivity
    D. To increase regulatory compliance (2 marks)

50. Which of the following statements is **TRUE** regarding query optimisation in a database management system?
    A. Query optimisation aims to increase the size of the database
    B. Query optimisation is not necessary for small databases
    C. Query optimisation is performed before query processing
    D. Query optimisation is a one-time process and does not affect performance (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 22 August 2023. Afternoon Paper. **Time Allowed: 2 hours.**

Answer ALL questions by indicating the letter (A, B, C, or D) that represents the correct answer. This paper is made up of fifty (50) Multiple Choice Questions. Each question is allocated two (2) marks.

1. A patient can be treated by many doctors and a doctor can treat many patients. This statement illustrates which type of relationship in a database?
   A. Many to one
   B. One to many
   C. Many to many
   D. One to one (2 marks)

2. Which of the following is a property which defines a relation?
   A. Attribute
   B. Tuple
   C. Entity
   D. Attribute domain (2 marks)

3. Which of the following **BEST** describes Management Information Systems (MIS)?
   A. A system used for managing enterprise day to day financial transactions
   B. A system that collects, processes, and presents information to support managerial decision-making
   C. A system that helps manage manufacturing processes
   D. A system used for employee scheduling and payroll management for better management and reporting (2 marks)

4. The relational integrity constraint which states that a key attribute cannot have NULL values is known as?
   A. Domain integrity
   B. Foreign key integrity
   C. Entity integrity
   D. Referential integrity (2 marks)

5. Which of the following is **NOT** an information system element?
   A. Hardware
   B. Software
   C. People
   D. Infrastructure (2 marks)

6. Which of the following is **NOT** a component of the Entity Relationship (ER) diagram?
   A. Entity
   B. Domain
   C. Attribute
   D. Relationship (2 marks)

7. Which of the following is **NOT** a query processing good practice?
   A. Perform set operations as early as possible
   B. Combine the Cartesian product with a subsequent selection operation whose predicate represents a join condition into a join operation
   C. Compute common expressions once
   D. Use associativity of binary operations to rearrange leaf nodes so that the leaf nodes with the most restrictive selection operations are executed first (2 marks)

8. The type of data independence that involves changing the conceptual scheme without changing external view is called?
   A. Conceptual data independence
   B. End user data independence
   C. Physical data independence
   D. Logical data independence (2 marks)

9. Which of the following is a component of a data warehouse architecture?
   A. Database hardware
   B. Metadata
   C. Software tools
   D. Data encryption (2 marks)

10. The process where metadata is used to map data sources to a common view of the data within the data warehouse is called?
   A. Warehouse management
   B. Query management
   C. Extraction and loading
   D. Query optimisation (2 marks)

11. Which of the following is **NOT** a primary goal of data warehouse physical design?
   A. Maximising query performance
   B. Minimising data storage requirements
   C. Optimising data loading processes
   D. Reducing data redundancy (2 marks)

12. Which of the following **BEST** describes a query that is written under the HAVING clause of another SQL query?
   A. Query
   B. Nested query
   C. Super-query
   D. Secondary query (2 marks)

13. Which of the following is a type of SQL join operation that returns records that have matching values in both tables?
   A. Inner join
   B. Left join
   C. Outer join
   D. Right join (2 marks)

14. Which of the following **CANNOT** be considered as an SQL data type?
   A. Integer
   B. Number
   C. Varchar
   D. Money (2 marks)

15. Which of the following is an SQL authentication mode?
    A. Mixed authentication mode
    B. Aggregate authentication mode
    C. Query authentication mode
    D. Sub query authentication mode (2 marks)

16. Which of the following SQL aggregate functions does **NOT** ignore null values?
    A. COUNT
    B. Maximum
    C. Minimum
    D. Sum (2 marks)

17. The data structure technique used to efficiently retrieve records from the database files based on some attributes is referred to as?
    A. Hashing
    B. Indexing
    C. Querying
    D. Allocation (2 marks)

18. Which SQL query will retrieve the customer IDs along with the total amount of orders placed by each customer, ordered by the total amount in descending order using the table named "Orders" below?

OrderID	CustomerID	OrderDate	Total Amount($)
1	1001	2022-10-05	100
2	1002	2022-10-06	50
3	1001	2022-10-07	75
4	1003	2022-10-08	200
5	1002	2022-10-9	125

    A. SELECT CustomerID, SUM(TotalAmount) AS TotalOrders FROM Orders GROUP BY CustomerID ORDER BY TotalOrders DESC;
    B. SELECT CustomerID, SUM(TotalAmount) AS TotalOrders FROM Orders GROUP BY CustomerID ORDER BY TotalOrders ASC;
    C. SELECT CustomerID, SUM(TotalAmount) AS TotalOrders FROM Orders GROUP BY CustomerID ORDER BY CustomerID ASC;
    D. SELECT CustomerID, SUM(TotalAmount) AS TotalOrders FROM Orders GROUP BY CustomerID ORDER BY CustomerID DESC; (2 marks)

19. What is the role of applied business intelligence in data mining?
    A. Business intelligence provides tools and techniques for data mining
    B. Business intelligence focuses on data storage and retrieval
    C. Business intelligence collects data from external sources
    D. Business intelligence encrypts data for secure storage (2 marks)

20. Which dependency indicates that if A and B are attributes of a relation R, B is fully functionally dependent on A if B is functionally dependent on A but **NOT** on any proper subset of A?
    A. Transitive dependency
    B. Partial dependency
    C. Full functional dependency
    D. Functional dependency (2 marks)

21. Which technology is becoming increasingly important for Management Information Systems due to its ability to handle large volumes of data?
    A. Relational databases
    B. NoSQL databases
    C. Flat-file databases
    D. Hierarchical databases (2 marks)

22. Which of the following is a primary function of a transaction processing system?
    A. Generating financial statements
    B. Managing human resources
    C. Tracking inventory levels
    D. Ensuring data integrity and reliability (2 marks)

23. Which of the following is **NOT** a cause of failure in a database?
    A. System crashes
    B. Media failure
    C. Programming language
    D. Application software errors (2 marks)

24. An integrated set of components for collecting, processing, distributing and storing data is called?
    A. Computerised system
    B. Data system
    C. Information system
    D. Digital system (2 marks)

25. Which of the following terms **BEST** describes the type of information system that enables knowledge workers to create, integrate and distribute knowledge?
    A. Expert systems
    B. Knowledge work systems
    C. Transaction processing systems
    D. Decision support systems (2 marks)

26. The facility of a DBMS that allows users to define the structure of the database, including tables, columns, and relationships, is called?
    A. Data modeling
    B. Data dictionary
    C. Data encryption
    D. Indexing (2 marks)

27. Which of the following **BEST** describes the characteristics of the information that is required by the lowest level managers in an organisation?
    A. It is sourced from internal sources, highly detailed and relevant to the long term
    B. It is sourced from external sources, highly summarised and relevant to the short term
    C. It is sourced from internal sources, highly detailed and relevant to the short term
    D. It is sourced from internal sources, highly summarised and relevant to the long term (2 marks)

28. Which emerging technology in data management information systems allows decentralised and distributed data storage and processing?
    A. Block chain
    B. Data mining
    C. Cloud computing
    D. Data warehousing (2 marks)

29. Which of the following **BEST** describes the information system that is used by companies to manage and integrate the important parts of their businesses?
    A. Payroll Management System
    B. Enterprise Resource Planning
    C. Supply chain Management System
    D. Human Resource Management System (2 marks)

30. Which of the following is a concurrency problem that occurs when one transaction takes summary over the value of all the instances of a repeated data item and second transaction updates few instances of that specific data item?
A. Non-Repeatable Read
B. Lost Updates
C. Incorrect Summary issue
D. Uncommitted dependency issues (2 marks)

31. The deadlock condition where a transaction is kept waiting for a resource that at the same time is held by some other transaction and which is further waiting for a third transaction is referred to as?
A. No preemption condition
B. Circular wait condition
C. Hold and wait condition
D. Mutual exclusion (2 marks)

32. The relational algebra operation that combines data and information of two differing relations into a single one is referred to as?
A. Cartesian product Operation
B. Set operation
C. Selection operation
D. Projection operation (2 marks)

33. Which set operation is used to combine the results of two SELECT statements, excluding any duplicate rows?
A. INTERSECT
B. EXCEPT
C. JOIN
D. UNION (2 marks)

34. Which of the following is a major objective of database design in a DBMS?
A. To design integration model
B. To map conceptual database model to an implementation model
C. To draw use case diagram
D. To design the database model (2 marks)

35. Which of the following components is **NOT** part of the data warehouse architecture?
A. Online Transaction Processing (OLTP) system
B. Extract, Transform, Load (ETL) process
C. Data marts
D. Data visualisation tools (2 marks)

36. Which software process model allows for flexibility and adaptation to changing requirements throughout the development cycle?
A. Waterfall model
B. Agile model
C. Spiral model
D. RAD model (2 marks)

37. Which of the following is an example of a transaction processing system (TPS)?
A. Customer relationship management (CRM) software
B. Enterprise resource planning (ERP) system
C. Point-of-sale (POS) system
D. Business intelligence (BI) tool (2 marks)

38. Which type of DBMS provides flexible schemas and high scalability for handling unstructured and semi-structured data?
A. NoSQL Database Management System
B. Object-Oriented Database Management System (OODBMS)
C. Object-Relational Database Management System (ORDBMS)
D. Relational Database Management System (RDBMS) (2 marks)

39. What is the purpose of data visualisation in data mining?
    A. To store data in a graphical format
    B. To extract patterns and relationships from data
    C. To provide an interface for querying databases
    D. To present data in a visual and intuitive manner (2 marks)

40. The type of locking mechanism that differentiates the locks based on their uses is referred to as?
    A. Shared lock
    B. Inclusive lock
    C. Binary lock
    D. Digital lock (2 marks)

41. Which of the following is a transaction property which states that when a transaction successfully completes, changes to data persist and are not undone even in the event of a system failure?
    A. Durability
    B. Atomicity
    C. Consistency
    D. Isolation (2 marks)

42. Which of the following is the Online Analytical Processing (OLAP) operation where less detailed data is converted into highly detailed data?
    A. Roll up
    B. Dice
    C. Drill down
    D. Slice (2 marks)

43. Which SQL clause is used to filter records based on a condition?
    A. GROUP BY
    B. ORDER BY
    C. WHERE
    D. HAVING (2 marks)

44. Which of the following is a benefit of the spiral model?
    A. Minimal planning and documentation required
    B. Well-suited for projects with fixed and stable requirements
    C. Quick delivery of software through pre-built components
    D. Iterative development with the ability to accommodate changing requirements (2 marks)

45. Which of the following is the fourth step involved in a typical knowledge discovery in database (KDD) Process?
    A. Data cleaning and preprocessing
    B. Data mining
    C. Data transformation
    D. Data selection and integration (2 marks)

46. The process of fixing incorrect, incomplete, duplicate or erroneous data in a data set is referred to as?
    A. Data transformation
    B. Data scrubbing
    C. Data aggregation
    D. Data visualisation (2 marks)

47. Which of the following can be used to query a native XML database?
    A. XPath expressions
    B. XMLPath expressions
    C. XML expressions
    D. XTML expressions (2 marks)

48. Which of the following describes the data mining methodology that includes descriptions of the typical phases of a project, the tasks involved with each phase and an explanation of the relationships between these tasks?
    A. RAD methodology
    B. Waterfall methodology
    C. CRISP-DM methodology
    D. Prototyping methodology (2 marks)

49. Which of the following statements is true about the role of MIS in organisations?
    A. MIS is primarily used for operational tasks
    B. MIS helps improve the efficiency and effectiveness of business processes
    C. MIS provides real-time information but does not support decision-making
    D. MIS is only used by top-level executive (2 marks)

50. Locking algorithms are used to manage concurrent access to data by multiple transactions or processes. Two-Phase locking (2PL) protocol is of one such algorithm that is characterised by?
    A. Acquiring all locks at the beginning and releasing them at the end of a transaction
    B. Acquiring and releasing locks in a single step
    C. Acquiring and releasing locks dynamically during a transaction
    D. Acquiring locks only when conflicts occur (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 25 April 2023. Afternoon Paper. **Time Allowed: 2 hours.**

Answer ALL questions by indicating the letter (A, B, C, or D) that represents the correct answer. This paper is made up of fifty (50) Multiple Choice Questions. Each question is allocated two (2) marks.

1. Which of the following is an objective of structured query language (SQL)?
   A. Create the database and relation structures
   B. Perform complex data management tasks
   C. Perform simple queries only.
   D. Perform complex queries only

2. The technology used in data management and information systems to securely manage and share data in decentralised networks is called?
   A. Big Data
   B. Data Warehouse
   C. Cloud Data
   D. Blockchain

3. Which of the following is **NOT** a basic search condition used in the SQL WHERE clause?
   A. Comparison
   B. Range
   C. Pattern match
   D. Test membership

4. The characteristics of valuable information described by the statement "The information must be free of bias and present a neutral perspective" is known as?
   A. Actionability
   B. Objectivity
   C. Completeness
   D. Accuracy

5. The join operation which combines data from two tables by forming pairs of related rows where the matching columns in each table have the same value is referred to as?
   A. Outer join
   B. Inner join
   C. Left inner join
   D. Left outer join

6. The type of information that enables middle level managers to make decisions is referred to as?
   A. Tactical information
   B. Strategic information
   C. Operational information
   D. Middle information

7. Business intelligence is an important emerging issue and trend in data mining. What issues is concerned with presentation of data in more intuitive and accessible ways to aid organisations to make well informed decisions based on their data?
   A. Data governance
   B. Big data analytics
   C. Data visualisation
   D. Machine learning

8. The characteristic of information that deals with the objectivity with which it is presented is referred to as?
   A. Timeliness
   B. Reliability
   C. Relevance
   D. Accuracy

9. Which one of the following is **NOT** a characteristic of OLAP as used in data management?
   A. OLAP is designed to support analysis of huge amount of data
   B. OLAP is designed to be highly normalised
   C. OLAP databases are designed to be de-normalised
   D. OLAP databases typically store a large amount of data

10. Business engineering involves a systematic approach to improving business processes. What is the primary goal of business engineering?
   A. To design new products
   B. To optimise business processes
   C. To improve customer satisfaction
   D. To increase profits

11. Which of the following is **NOT** a function of the ALTER TABLE command in SQL?
   A. Add a new column to a table
   B. Drop a column from a table
   C. Delete a new table constraint
   D. Drop a table constraint

12. The integrity constraint which states that no tuple entry of the primary attribute shall be null is referred to as?
   A. Referential integrity constraint
   B. Entity integrity constraint
   C. Domain integrity constraint
   D. Primary key integrity constraint

13. Which of the following is a data mining technique?
   A. Time series analysis
   B. R-programming
   C. KNIME
   D. RapidMiner

14. The type of join in database systems that returns all rows from both tables, with matching rows combined, and non-matching rows displayed as NULL values is known as?
   A. Left join
   B. Right join
   C. Inner join
   D. Full outer join

15. The type of entity relationship diagram notation that uses diagrams to represent entities as boxes and relationships as lines between the boxes is referred to as?
   A. Chen notation
   B. UML notation
   C. Crow’s foot notation
   D. HTML notation

16. Which of the following **CANNOT** be used to describe the degree of a relationship?
    A. Unary
    B. Quaternary
    C. Binary
    D. Tertiary

17. The unary operation works on a single relation R and defines a relation that contains only those tuples of R that satisfy the specified condition is referred to as?
    A. Set operation
    B. Selection operation
    C. Projection operation
    D. Join operation

18. Which of the following is **NOT** an Entity Relationship (ER) design issue?
    A. Difficulty in deciding whether an object can be best represented by an entity set or relationship set.
    B. Choosing binary vs n-ary relationship sets
    C. Placing relationship attributes.
    D. Choosing between relationship sets and attributes

19. The dependency that expels certain tuples from being in a relation is referred to as?
    A. Multi valued dependency
    B. Functional dependency
    C. Full functional dependency
    D. Transitive dependency

20. The process of inspecting, cleansing, transforming and modelling data with the goal of discovering useful information is referred to as?
    A. Data pre-processing
    B. Data transformation
    C. Data analysis
    D. Data design

21. Student number, student first name, lecturer number and course code are examples of?
    A. Attributes
    B. Entities
    C. Relationships
    D. Entity sets

22. What is the main difference between a query and a transaction in a database?

    A. A query is used to retrieve data from a database, while a transaction is used to perform a series of operations on the data
    B. A transaction is used to retrieve data from a database, while a query is used to perform a series of operations on the data
    C. A query and a transaction are the same thing
    D. A transaction is used to store data in a database, while a query is used to retrieve data from a database

23. The operation of moving from finer-granularity data to a coarser granularity is referred to as?
    A. Drill down
    B. Dicing
    C. Rollup
    D. Pivoting

24. What is the purpose of the WHERE clause in a SELECT statement in SQL as used in database systems?
    A. To limit the results to only those that meet certain conditions
    B. To specify the columns to retrieve
    C. To specify the sort order of the results
    D. To specify the tables to join

25. The standardised language for creating visual models of software systems, which provides a set of graphical notation and symbols to describe the structure and behavior of software systems such as objects, classes, interfaces and interactions between them is called?
    A. Multi-dimensional modeling
    B. Entity-Relation modeling
    C. DFD modeling
    D. Unified Modeling language

26. Which of the following is **TRUE** about data visualisation?
    A. Data visualisation does not make complex data more accessible, understandable and usable.
    B. Data visualisation makes complex data more accessible, understandable and usable.
    C. Data visualisation is not used to communicate information clearly and efficiently to users by the usage of information graphics such as tables and charts.
    D. Data visualisation helps users in analysing a small amounts of data in a simpler way.

27. Select the data mining technique that is used to group similar instances together?
    A. Classification
    B. Regression
    C. Anomaly detection
    D. Clustering

28. Which of the following is **NOT** a schema in the ANSI-SPARC three-level architecture?
    A. A global conceptual schema
    B. A fragmentation schema
    C. Allocation schema
    D. A set of global internal schemas

30. The database transparency concept that allows the database user to perceive the database as a single, logical entity is referred to as?
    A. Transaction transparency
    B. Distribution transparency
    C. Performance transparency
    D. DBMS transparency

31. Which of the following is **NOT** a component of the query processor?
    A. DDL interpreter
    B. DML compiler
    C. DDL compiler
    D. Query Evaluation Engine

32. Which of the following **CANNOT** be classified as a function of a DBMS?
    A. For reducing the data redundancy and inconsistency.
    B. For enhancing the data security.
    C. For data indexing
    D. For ensuring data dependence.

33. The type of data structure that is used to quickly locate and access data in database table is referred to as?
    A. Indexing
    B. Hashing
    C. Modelling
    D. Querying

34. The process of merging data from multiple sources into a single repository in database systems is called?
    A. Extraction
    B. Loading
    C. Integration
    D. Ingestion

35. Which of the following is **NOT** a DBMS transaction state?
    A. Aborted State
    B. Partial state
    C. Failed State
    D. Committed State

36. The "All or nothing rule" as a property of a transaction is referred to as?
    A. Atomicity
    B. Consistency
    C. Isolation
    D. Durability

37. The special DBMS table that contains a description of all the database transactions executed by the DBMS is referred to as?
    A. Transaction table
    B. Transaction log
    C. Transaction schedule
    D. Transaction lock

38. In concurrency control, the type of lock that exists when access to a data item is specifically reserved for the transaction that locked the object is referred to as?
    A. Shared lock
    B. Concurrent lock
    C. Read lock
    D. Exclusive lock

39. What is a functional dependency in a relational database?
    A. The relationship between two attributes in a table
    B. The relationship between a primary key and a foreign key
    C. The relationship between a candidate key and other attributes in a table
    D. The relationship between two tables

40. Which of the following is **NOT** a best practice when building KPI dashboards?
    A. Visual consistency in colors, graphic elements and topography
    B. Effective use of language to highlight critical metrics
    C. All non-critical targets and information must be presented clearly to guide the user through a data journey based on their use case.
    D. Efficient use of interactable elements to lead to appropriate action

41. What is the role of metadata in data management?
    A. To store the data itself
    B. To describe the characteristics of data
    C. To process data into information
    D. To control access to data

42. The data mining technique that focuses on finding patterns that characterise the general properties of the data in the database is referred to as?
    A. Predictive data mining
    B. Descriptive data mining
    C. Prescriptive data mining
    D. Diagnostic data mining

43. A data structure that improves the efficiency of data retrieval operations in database storage and querying is named?
    A. Lock.
    B. Pointer.
    C. Join
    D. Index

44. Which of the following **BEST** describes the activity that involves the radical redesign of business processes in an organisation?
    A. Business process engineering
    B. Business process re-engineering
    C. Business process improvement
    D. Business process planning

45. A program with features that control the creation, maintenance and use of a database is referred to as?
    A. Database management system
    B. Database administrator
    C. Database analyst
    D. Database manager

46. Which of the following is **NOT** a function of a data warehouse?
    A. Data scrubbing
    B. Data integration
    C. Data mining
    D. Data cleaning

47. The KPI dashboards that help organisations to understand if their performance is on target are referred to as?
    A. Analytical KPI dashboard
    B. Strategic KPI dashboard
    C. Operational KPI dashboard
    D. Interactive KPI dashboard

48. Which of the following will provide a blueprint or schema for objects in an object database?
    A. Method
    B. Pointer
    C. Object
    D. Class

49. A virtual table that provides a customised perspective on the data stored in the database is called?
    A. Trigger
    B. Snapshot
    C. View
    D. Schema

50. Which of the following **CANNOT** be performed by database queries?
    A. To summarise data
    B. To separate data from various tables
    C. To adjust data
    D. To update databases

…….

CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 6 December 2022. Afternoon Paper. **Time Allowed: 2 hours.**

Answer ALL questions by indicating the letter (A, B, C, or D) that represents the correct answer. This paper is made up of (50) multiple choice questions. Each question is allocated two (2) marks.

1. Which one of the following is **NOT** a component of the DataBase Management System (DBMS)?
   A. Data
   B. Presentation
   C. Data Mart
   D. Application (2 marks)

2. Choose the data integration approach, that is the **MOST** suitable for streaming data in real time as used in data warehousing
   A. ETL
   B. ELT
   C. P2P
   D. ABI (2 marks)

3. What is the name given to a query containing another query in structured query language (SQL)?
   A. Inner query
   B. Outer query
   C. Nested query
   D. In-memory query (2 marks)

4. Data quality is essential to the success of a data warehouse. Which of the following information quality factor refers to "the degree to which information matches the reality"?
   A. Correctness
   B. Accuracy
   C. Precision
   D. Completeness (2 marks)

5. Data can be distinguished by the degree of organisation between elements. Which of the following is an example of semi-structured data structure?
   A. A database
   B. XML data
   C. Audio data
   D. Spreadsheet data (2 marks)

6. Choose the **CORRECT** statement from the list of data management statements below.
   A. OLTP is characterised by operational processing
   B. OLTP access is mostly read only
   C. OLAP view is summarized and consolidated
   D. OLAP unit of work is simple transactions (2 marks)

7. Chooses from the list below the statement that **BEST** describes an algorithm that allows a transaction to continue processing, when serializability could be compromised, in believe that it probably won't be in transaction management.
   A. Pessimistic
   B. Optimistic
   C. Deadlock
   D. Brute-force (2 marks)

8. To efficiently retrieve records from the database file, indexing is fundamental. Which of the following is a type of ordered indexing?
   A. Primary index
   B. Clustering index
   C. Secondary index
   D. Sparse index (2 marks)

9. Which tier of the DBMS architecture is **BEST** described by the statement: "All the components of DBMS reside on the same machine"?
   A. Three tier
   B. One tier
   C. Two tier
   D. Agglomerated Tier (2 marks)

10. Which of the following terms represents the special value used to represent values that are unknown or non-applicable to certain attributes in database design?
   A. NULL
   B. NIL
   C. EMPTY
   D. ZERO (2 marks)

11. Which of the following is a disadvantage of normalization process as used in database management systems?
   A. Removes data redundancy in the database
   B. It leads to more tables in the database
   C. It solves the insert, delete and update anomalies
   D. It makes data to lose its integrity (2 marks)

12. Select from the list below the person in-charge of establishing schema for the database by interacting with the users to understand data structure requirements?
   A. Data manager
   B. Database administrator
   C. Database developer
   D. Database designer (2 marks)

13. Select the **CORRECT** SQL statement that finds the student whose lastname has an "in" character in it.
   A. SELECT Students FROM lastname WHERE lastname LIKE '%in%'
   B. SELECT lastname FROM Students WHERE lastname LIKE '%in%'
   C. SELECT lastname FROM Students WHERE lastname LIKE '*in*'
   D. SELECT Students FROM lastname WHERE lastname LIKE '*in%' (2 marks)

14. Which of the following is **NOT** an action done at the data modeling level?
   A. Creating relationships between entities
   B. Determining the attributes of entities
   C. Determining the cardinalities of relationships
   D. Data access and programming (2 marks)

15. What is the name given to a database constraint that requires a foreign key to have a matching primary key or must be null?
   A. Domain integrity
   B. Entity integrity
   C. Referential integrity
   D. Enterprise constraint (2 marks)

16. What is the name given to the activity of choosing an efficient strategy for retrieving data from the database?
    A. Query processing
    B. Query optimisation
    C. Query parsing
    D. Algorithmic processing (2 marks)

17. Which of the following statements is **NOT** true as used in data management systems?
    A. Creation of virtual database to consolidate data from disparate source is called data federation
    B. Combination of data from multiple system to create a single decentralized data source for analytics is called data consolidation
    C. Copying data from one location to another on an event-driven basis is called data propagation
    D. Data integration that involves using common storage area, to clean, format and store data is called a database (2 marks)

18. Which of the following is **NOT** a major challenge of data management in the era of big data?
    A. Lack of skilled personnel
    B. Lack of data
    C. Data Security
    D. Handling huge amount of data (2 marks)

19. The addition of redundant data into one or more tables of a database, to optimize and speed up data retrieval is called?
    A. Normalisation
    B. Association
    C. Dis-association
    D. De-normalisation (2 marks)

20. Database constraints ensure that rules defined at data model creation are enforced when the data is manipulated. Which of the following is **NOT** a database constraint?
    A. Missing
    B. Check
    C. Default
    D. Unique (2 marks)

21. The most popular query language used by major relational database management systems is the Structured Query Language (SQL). Name the default keyword used by "order by" command when the sorting method is not defined explicitly.
    A. Sort by
    B. ASC
    C. Order by
    D. DESC (2 marks)

22. Which of the following statements is **NOT** true about data model as used in database systems?
    A. A data model is set of concepts used to describe the structure a database
    B. Conceptual data models provides concepts close to the way users perceive data
    C. The data models can change frequently
    D. Data models can be categorized by the number of users (2 marks)

23. Concurrent access of a database by transactions at the same time can have a far reaching impact, which can lead to the following problems **EXCEPT**?
    A. The inconsistent analysis problem
    B. The lost update problem
    C. The uncommitted dependency problem
    D. The data Update problem (2 marks)

24. What is the most basic component of a file in a file system?
    A. Data item
    B. Record
    C. Operating System
    D. Kernel (2 marks)

25. Choose the name given to the operation in relational database that is used to display some attributes in a database table.
A. Selection
B. Intersection
C. Projection
D. Join (2 marks)

26. Identify the type of functional dependency shown below as used in relational database design.
X ⟶ Y
Y ⟶ Z, then
X ⟶ Z

A. Transitive
B. Partial
C. Full
D. Reflexivity (2 marks)

27. Your organisation database is storing approximately 1000 employees' records in the registry table. You are interested in getting a report on the available departments in your organisation. However, it displays repeating departments. Which SQL keyword would be used alongside the SELECT command to avoid this repetition?
A. UNIQUE
B. SELECT
C. FILTER
D. DISTINCT (2 marks)

28. The DBMS systems must provide facilities that assist in recovery from failures. Which of the following DBMS facility, enables updates to database in case of database failure?
A. Backup mechanism
B. Logging facility
C. Checkpoint facility
D. Recovery manager (2 marks)

29. Which of the following formal and informal relational database terms do **NOT** correctly match?
A. Tuple-Record
B. Relation-Table
C. Attribute-Field
D. Character-Relation (2 marks)

30. Which of the following is a data integrity question used to understand the user need during database design?
A. What should the system do?
B. What values are allowed in which field?
C. How disastrous will it be if the system clashes?
D. Do users need access to different pieces of data? (2 marks)

31. The lowest level of abstraction that describes what data are stored in a database is known as?
A. Logical
B. Physical
C. View
D. Kernel (2 marks)

32. Which of the following types of file organisation mechanism does the operating system allocate memory area without ordering the records?
A. Sequential
B. Hash
C. Heaped
D. Clustered (2 marks)

33. Name the tool that enables an application programmer to construct forms and reports without writing a program in database system development.
A. Rapid Application Development
B. Report generators
C. Prototyping
D. Design (2 marks)

34. The set of agreed upon shapes, symbols, and notations that would be used to graphically depict each component that makes up a software system, its attributes and how it relates to other components within the system established by the Object Management Group (OMG) is known as?
A. Rules
B. Conventions
C. UML
D. CODASYL (2 marks)

35. A data model is the underlying structure of the database. Which data model uses connections among the nodes allowing a record to have more than one parent?
A. Hierarchical
B. Network
C. Object oriented
D. Entity-Relational model (2 marks)

36. Which of the following is **TRUE** about data visualisation as used in data mining and business intelligence?
A. It involves designing the schema for data warehouses
B. Facilitate faster access to data across the entire organisation
C. It is performed by data architects and modelers
D. It involves the use of graphs, charts, and tables to present data visually (2 marks)

37. Security of the data is very crucial in a database environment. Which of the following is **NOT** a database security threat?
A. Accidental disclosure
B. Unauthorised disclosure
C. Insertion anomaly
D. Destruction (2 marks)

38. What name, is given to the type of attribute that contain values calculated from other attributes as used in an entity relationship model?
A. Derived
B. Composite
C. Multivalued
D. Simple (2 marks)

39. In database systems, file operations are classified into retrieval or update operations. Which of the following is an activity of the retrieve operation?
A. Update
B. Read
C. Delete
D. Modify (2 marks)

40. What SQL keyword, ensures that the value in a column meets a specific condition?
A. Not Null
B. Null
C. Check
D. Constraint (2 marks)

41. Choose the language used for storing, transferring and retrieving hierarchical data as used in database systems
A. SQL
B. Access
C. Java
D. XML (2 marks)

42. The database aspect, where different parts of the database do not hold contradictory views for the same information is known as?
A. Accuracy
B. Validity
C. Consistency
D. Integrity (2 marks)

43. Which of the following is **NOT** a characteristic of First Normal Form (1NF) as used in database normalisation?

A. Each attribute must have a unique name
B. The order of tuples and attributes matters
C. Two tuples cannot contain identical values
D. Each attribute must have one data type (2 marks)

44. Professional advice from the database record, showing who made the modification, and whether authorised or not, heavily rely on a record in database system known as?
A. Audit trails
B. Quota
C. Turnkey record
D. Dirty page (2 marks)

45. Which of the following refer to a set of commands that automatically get executed when an event like insert, update or delete of row occurs in a table?
A. Stored procedure
B. SQL commands
C. Database trigger
D. Query optimisation (2 marks)

46. Which of the following SQL commands is misplaced in the list below?
A. Commit
B. Truncate
C. Drop
D. Alter (2 marks)

47. The broad category of applications and technologies for gathering, storing, analyzing and providing access to data to help enterprise users make better business decisions is known as?
A. Data management
B. Data mining
C. Business Intelligence
D. Automated management (2 marks)

48. Which of the following capability is given to the native users in database system?
A. Account creation
B. Interaction with the database
C. Security level assignment
D. Database object rights revocation (2 marks)

49. Which of the following is the correct characteristic of a closed system?
A. They have an interaction with the environment
B. It has input from the environment
C. It is flexible in nature
D. They are rigid in nature (2 marks)

50. Which of the following is a description of metadata as used in database design?
A. The student's name is Khandesi
B. The student's name cannot be blank
C. The student's age is 21
D. The student's height is 5 feet (2 marks)

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CISSE INTERMEDIATE LEVEL

DATA MANAGEMENT INFORMATION SYSTEMS

TUESDAY: 2 August 2022. Afternoon paper. **Time Allowed: 2 hours.**

Answer ALL questions. **Each question is allocated two (2) marks.**

1. The characteristic of valuable information that ensures that the information is correct by checking from many sources of the information is called?
   A. Accuracy
   B. Reliability
   C. Verifiability
   D. Relevant

2. _____ is an integrated set of components for collecting, storing, and processing data and for providing information, knowledge, and digital products.
   A. Data system
   B. Digital system
   C. Information system
   D. Computerised system

3. A decision that is made by a manager in an organization through brainstorming and rules can be referred to as?
   A. Unstructured decision
   B. Structured decision
   C. Semi structured decision
   D. Complete decision

4. An unordered collection of elements that may contain duplicates is known as?
   A. Set
   B. Bag
   C. List
   D. Dictionary

5. Which of the following is **NOT** an emerging technology in databases?
   A. Presentation and display by use of report generators
   B. The mode of processing is parallel processing
   C. Natural language user interfaces
   D. The merging of data models with knowledge representation

6. The following is a characteristic of a weak entity.
   A. It has a primary key
   B. It is not dependent of the strong entity
   C. It has a partial key
   D. Weak entity always does not have a total participation

7. Which of the following are the correct steps of a business continuity planning process?
   A. Preparedness-Prevention-Response-Recovery
   B. Preparedness-Prevention-Recovery-Response
   C. Prevention-Preparedness-Response-Recovery
   D. Response-Prevention-Preparedness-Recovery

8. "The informative blue book in the modern library is placed on a shiny tall brown cabinet". Which of the following **CANNOT** be used as an entity when modeling an Entity-Relationship-Diagram (ERD) as used in database design
   A. Book
   B. Tall
   C. Library
   D. Cabinet

9. Which of the following statement best describes invention?
   A. Improvement to the existing ideas
   B. A new creation never seen before
   C. Modification of the exiting artefact
   D. Transforming of an idea of an idea or resources into useful application

10. _____ is the technique that allow data to be changed without affecting the applications that process it such as changing the way the database is physically stored and accessed without having to make corresponding changes to the way the database is perceived by the user
   A. Data abstraction
   B. Data isolation
   C. Data independence
   D. Data concurrency

11. Given the relation below, identify the correct option that matches the degree and tuples of the relation respectively

Regno	**Surname**	**Dept**	**Fee paid**
709	George	IT	45000
101	Oloo	Business	23990
561	Mutange	IT	43000
678	Juma	Engineering	43000
045	Mamo	Business	34000

   A. 1,0
   B. 0,1
   C. 4,5
   D. 5,4

12. Which of the following best describe normalisation as used in database systems
   A. It refers to the process where a relational database is restructured in a series known as normal forms designed to reduce data redundancy and improve data integrity
   B. It is a condition that occurs within a database or data storage technology in which, you can find the same piece of data in two or more separate places
   C. It is the process of attempting to optimise the performance of a database by adding redundant data or by grouping data
   D. It is a systematic process to design a database as it would require you to analyse all data requirements before implementing your database

13. Which of the following statements about the Enterprise Data Warehouse is **CORRECT?**
   A. It has normal
   B. It is modelled using E-R modelling technique
   C. It has de-normalised tables
   D. It is used for online transactions processing

14. _____ is a centralised repository that allows you to store all your structured, semi-structured and unstructured data to store every type of data in its native format. Data is stored as-is, without having to first structure the data, and run different types of analytics
    A. Data warehouse
    B. Database
    C. Data Lake
    D. Data Mart

15. SQL allows the use of the absence of information about the value of an attribute. Select from the list below the SQL keyword that enables the absence
    A. NIL
    B. NULL
    C. EMPTY
    D. NOT

16. Which of the following is NOT an activity of a transaction processing system?
    A. Order processing
    B. Payments and receivables processing
    C. Inventory records
    D. Data analysis

17. The online analytical processing system where a relational database and multidimensional cubes divide the data is called
    A. ROLAP
    B. MOLAP
    C. HOLAP
    D. Data Lake

18. Suggest the statement that best describes the overall objective of the data warehouse
    A. It enables users to run complex queries on data that transverse diverse enterprise areas
    B. Escalates the productivity and effectiveness of decision-making in an organization
    C. Used to organise store and store data relevant to enterprises everyday activities
    D. It commands the structure of the schemas and tables in an organisation database system

19. Which of the following is a role of Data Manipulation Language as used in database systems?
    A. Setting the indices to be used in each schema
    B. The security and authorization of each schema
    C. The number of rows may be increased or decreased
    D. Grant permission to object created by one person to another

20. What name do we give to the condition that occurs when the same data exists in different formats in multiple tables
    A. Data redundancy
    B. Data inconsistency
    C. Data Integrity
    D. Data isolation

21. Which of the following term is applied to programming languages, design methods and database systems to mean providing support from constructs such as objects, classes, generalization and aggregation
    A. Object modelling
    B. Object class
    C. Object-oriented
    D. Object oriented data model

22. Multi-tenancy is an emerging trend in cloud computing, where a single database is shared by multiple parties Which of the following statement is NOT true about multi-tenancy?
    A. Tenant cede to have the control of the database
    B. Tenants are logically isolated but physically isolated
    C. Tenants have full control of the database
    D. The hosting is efficient with a low cost of maintenance

23. The process of extracting the common features from a group of object class and suppressing the detailed differences between the objects is referred to as
    A. Inheritance
    B. Aggregation
    C. Cardinality
    D. Generalisation

24. The relational database model that contains data about the dimensions in form of cubes mostly used for analytical purposes is called?
    A. Semantic model
    B. Flat model
    C. Hierarchical model
    D. Multidimensional model

25. The plan that focuses on how your organisation will recover and rebuild following any crisis is known as
    A. Business continuity plan
    B. Mitigation plan
    C. Disaster recovery
    D. Strategic plan

26. You are the operator of a database management system that is used to keep information about the employee's payroll. You perform the calculations of the casual employees paid wages based on the number of days worked. Just before you post the record after calculation, you are required to verify the results. What state of the transaction are you in during the verification stage?
    A. Partially committed
    B. Committed
    C. Active
    D. Partially committed and committed

27. Which database object enables the request to access data from a database to manipulate it or retrieve it, allowing us to perform logic with the information is?
    A. Form
    B. Query
    C. Report
    D. View

28. Select the correct steps in a business re-engineering process
    A. Create a vision→pick the process→find a facilitator→manage change
    B. Pick the process →create a vision→find a facilitator→manage change
    C. Find a facilitator→ pick the process→create a vision →manage change
    D. Manage change → pick the process→create a vision → find a facilitator

29. Which of the following is a component of a data warehouse as used in applications of database systems?
    A. Volume of data
    B. Operational data
    C. Snowflake
    D. Schema

30. The type of the key performance indicator reports focused predominantly on the day to day activities of an organisation is called
    A. Strategic reports
    B. Operational reports
    C. Dashboard reports
    D. Analytical report

31. The referential integrity constraints that automatically delete the dependent rows that correspond with the parent side row to be deleted is called_____
    A. Cascade
    B. Set to null
    C. Restrict
    D. Set to default

32. Which of the following does **NOT** fall under the cyber-attack or data breaches as used in database security?
    A. Malware
    B. Phishing attacks
    C. Ransom ware
    D. Vandalism

33. You have been hired as a database engineer in a data science department in a banking institution. Highlight the data mining technique, that you recommend for use to determine if a particular credit card transaction may be either normal or fraudulent
    A. Clustering
    B. Association
    C. Prediction
    D. Classification

34. The information that includes information that describes the file such as the address of the file blocks on disk is called
    A. File descriptor
    B. Attributes
    C. Properties
    D. Metadata

35. Given the database schema: student (regno, surname, course, gender). Select the SQL statement to modify the relation and include a new attribute "feepaid"
    A. UPDATE TABLE student ADD feepaid FLOAT
    B. ALTER TABLE student ADD feepaid FLOAT
    C. MODIFY TABLE student ALTER feepaid FLOAT
    D. INSERT INTO TABLE student MODIFY feepaid FLOAT

36. What is the name given to the disk performance metric, that determines the speed at which data can be retrieved from or stored to the disk?
    A. Access time
    B. Latency
    C. Seek time
    D. Data-transfer rate

37. Which of the following statement is true about the in-memory database systems
    A. It uses the disk-based technology
    B. It degrades the performance of the system
    C. It is faster than disk-based systems
    D. It does not allow real-time analytical processing

38. What do we call, a means of expressing that the value of one particular attribute is associated with a single, specific value of another attribute?
    A. Relationship
    B. Aggregation
    C. Functional dependency
    D. Cascade

39. Which of the following is NOT a characteristic of an Enterprise Resource Planning System?
    A. Real-time
    B. Cross-functional
    C. Integrated
    D. Unilateral

40. _____ is a transaction state whereby the transaction does not complete and none of its actions are reflected in the database
    A. Commit
    B. Abort
    C. Redo
    D. Failed

41. Which of the following property of a relation is **CORRECT?**
    A. Relationship is named
    B. There is a significance to order of tuples
    C. Every Attribute must be multi valued
    D. There is a significance to order of attributes

42. Choose the factor **NOT** to consider when choosing a database product
    A. Budget
    B. Availability of support
    C. Compatibility with the existing technology
    D. Customer taste

43. Modern databases are significant part of modern-day information systems. When developing such systems, we should put into considerations the type of data to be handled by the database system. Modern systems should handle complex data. Which of the following is not a complex data as used in trends in database technology?
    A. Video
    B. Schema
    C. Audio
    D. Images

44. Which if the following statements best describes the situation when vertical partitioning is necessary as used in database performance
    A. It is used when different users need access to different records
    B. It is used when different users need access to different attributes
    C. It is used when different users need access to both records and columns
    D. Used to distribute rows in several files

45. Data model enables the database to be treated as an abstract machine. There are various data models used in database systems. Which database model applies formal logic using propositions data elements to problems of data definition, manipulation and integrity
    A. Relational data model
    B. Deductive data model
    C. Object-oriented data model
    D. Semantic data model

46. Select the name given to the minimum number of times an instance in one entity can be associated with an instance in a related entity.
    A. Relationship
    B. Cardinality
    C. Association
    D. Modality

47. Denormalisation is a technique used in database design to allow the addition of duplicated data to relations. Which of the following is NOT an advantage of denormalisation in database systems?
    A. Minimise joins in relational database
    B. Decrease performance
    C. Reducing the number of relations
    D. Date retrieval is faster

48. The aggregate SQL function that returns the number of rows in a table satisfying the criteria specified in the **WHERE** clause is
    A. GROUBY
    B. COUNT
    C. HAVING
    D. CASE

49. The core component of the DBMS that interacts with the file system at an OS level to store data is called_____
    A. Query Processor
    B. Log manager
    C. Optimisation engine
    D. Storage engine

50. Which of the following facts is **TRUE** about physical data independence as used in databases
    A. It is concerned with conceptual schema
    B. An example is deletion on an attribute
    C. It is mainly concerned with the storage of data
    D. It is concerned with the structure or changing the data definition

…….