1. What is a database?

a) Organized collection of information that cannot be accessed, updated, and managed

b) Collection of data or information without organizing

c) Organized collection of data or information that can be accessed, updated, and managed

d) Organized collection of data that cannot be updated

Answer: c

Explanation: It is defined as an organized collection of data or information for easy access, updating, and management in a computer.

2. A company has multiple departments that frequently update a shared employee database. If two departments try to update the same record simultaneously, which DBMS feature ensures data remains consistent?

a) Metadata storage

b) Concurrency control

c) Data redundancy

d) Data independence

Answer: b

Explanation: Concurrency control ensures that simultaneous updates do not lead to data inconsistency.

3. What is DBMS?

a) DBMS is a collection of queries

b) DBMS is a high-level language

c) DBMS is a programming language

d) DBMS stores, modifies and retrieves data

Answer: d

Explanation: DBMS is nothing but a storehouse wherein the authorized user can create a database to store, modify, or retrieve the organized data in the table. It can be modified or retrieved by users who have access to DBMS only.

4. Which type of data can be stored in the database?

a) Image-oriented data

b) Text, files containing data

c) Data in the form of audio or video

d) All of the above

Answer: d

Explanation: The reason for creating the database management system was to store large data and these data can be of any form image, text, audio, or video files.

5. Which of the following is not an example of DBMS?

a) MySQL

b) Microsoft Access

c) IBM DB2

d) Google

Answer: d

Explanation: MySQL, Microsoft Access, IBM DB2 are database management systems while Google is a search engine. Google's Bigtable is the database that runs Google's Internet search and other products.

6. A startup migrates from spreadsheets to a DBMS because they need secure, multi-user access with backups. However, they face higher maintenance costs and need specialized staff. Which statement best explains this situation?

a) DBMS improves data security and sharing but increases cost and complexity.

b) DBMS decreases cost and complexity but reduces performance.

c) DBMS cannot handle multiple users.

d) DBMS is not suitable for large datasets.

Answer: a

Explanation: DBMS offers benefits like security and multi-user access but comes with higher operational costs.

7. A small bakery decides not to use a DBMS because their data is minimal and they find spreadsheet management sufficient. This decision reflects which DBMS limitation?

a) Complexity of backup

b) Cost and complexity for small-scale data

c) Lack of security

d) Poor scalability

Answer: b

Explanation: For small-scale data needs, a DBMS can be overkill due to setup complexity, maintenance, and cost.

8. Which of the following is NOT a benefit of DBMS?

a) Enhanced data security

b) Reduced data duplication

c) Automatic backup and recovery

d) Elimination of all data storage costs

Answer: d

Explanation: DBMS reduces duplication and improves security, but it cannot eliminate storage costs — it may increase them due to storage requirements.

9. A multinational company stores data in multiple locations using a DBMS. However, network downtime in one region delays access for others. This is an example of:

a) Benefit of distributed DBMS

b) Limitation due to dependency on network availability

c) Concurrency control issue

d) Data redundancy problem

Answer: b

Explanation: DBMS in distributed setups depends heavily on network connectivity; downtime can hinder access despite advantages.

10. Which limitation of DBMS can affect system performance when handling very large data sets with many simultaneous users?

a) Data security

b) Data redundancy

c) Performance overhead due to transaction management

d) Data independence

Answer: c

Explanation: Additional processing for concurrency, recovery, and transaction management can introduce performance overhead in large systems.

11. A university implemented a DBMS to manage student data, but the admin staff finds the system difficult to operate without training. This limitation is due to:

a) High complexity of DBMS operation

b) Poor concurrency control

c) Lack of data independence

d) Reduced data sharing

Answer: a

Explanation: DBMS often requires skilled personnel; without training, the complexity can hinder productivity.

12. In a two-tier DBMS architecture, the application communicates directly with:

a) The database server

b) The client's local file system

c) Another application server

d) The internet browser

Answer: a

Explanation: In two-tier architecture, the client directly interacts with the database server for queries.

13. Which layer of three-tier architecture contains the DBMS and is responsible for data storage, retrieval, and management?

a) Presentation layer

b) Application layer

c) Data layer

d) Network layer

Answer: c

Explanation: The data layer stores and manages data via the DBMS.

14. In a three-tier DBMS architecture, what is the role of the middle tier (application server)?

a) It stores raw data on disk

b) It handles query processing and business logic

c) It formats data for presentation

d) It manages hardware resources for data storage

Answer: b

Explanation: The middle tier processes requests and applies business logic between client and database.

15. Which of the following is an advantage of three-tier architecture over two-tier?

a) Direct communication between client and database

b) Reduced application complexity

c) Better scalability and security

d) Lower initial setup cost

Answer: c

Explanation: Three-tier architecture improves scalability and security via an added application layer.

16. A retail company wants its desktop application to directly connect to the database but has security concerns. Which architecture should they move to for better control?

a) One-tier

b) Two-tier

c) Three-tier

d) None, keep two-tier

Answer: c

Explanation: Three-tier architecture adds application layer providing authentication and security.

17. An organization uses a three-tier DBMS with a web-based front end. During peak traffic, users complain about slow performance even though the database server is idle. Which layer is likely causing the bottleneck?

a) Presentation layer

b) Application layer

c) Data layer

d) Network layer

Answer: b

Explanation: Heavy business logic in application layer can cause slowdowns despite database idleness.

18. Which statement best describes one-tier architecture in DBMS?

a) All components run on the same machine

b) Application runs on client, DBMS on server

c) Application server acts as middleware

d) Used only in distributed databases

Answer: a

Explanation: One-tier architecture runs all layers on the same system, often local databases.

19. A banking system uses two-tier architecture where desktop apps connect directly to the database. To improve security, what design change is recommended?

a) Move to three-tier architecture

b) Switch to one-tier

c) Use flat file storage

d) Reduce database size

Answer: a

Explanation: Application layer in three-tier validates and sanitizes queries enhancing security.

20. In a web-based DBMS application, HTTP request flows client → web server → DBMS server. This setup is an example of:

a) One-tier architecture

b) Two-tier architecture

c) Three-tier architecture

d) Distributed file system

Answer: c

Explanation: Web applications typically use three-tier: client, application server, database server.

21. In a library database, Books and Authors have a many-to-many relationship. The table BookAuthors(BookID, AuthorID) represents:

a) Multivalued attribute of Book

b) Schema for relationship set

c) Composite attribute of Author

d) Derived attribute of Book

Answer: b

Explanation: Many-to-many relationships are managed via separate tables representing relationship sets.

22. The attribute AGE calculated from DATE_OF_BIRTH is:

a) Single valued

b) Multi valued

c) Composite

d) Derived

Answer: d

Explanation: AGE is derived from another attribute's value.

23. Which of the following is a single valued attribute?

a) Register_number

b) Address

c) SUBJECT_TAKEN

d) Reference

Answer: a

24. In a relation between entities, the type and condition of the relation is called:

a) Descriptive

b) Derived

c) Recursive

d) Relative

Answer: a

Explanation: Descriptive attributes describe the relationship itself.

25. In a hotel reservation system, Reservation relationship stores CheckInDate and CheckOutDate. These dates are:

a) Multi-valued attributes of Room

b) Composite attributes of Guest

c) Descriptive attributes of the relationship

d) Derived attributes of Room

Answer: c

Explanation: Dates describe the relationship, not individual entities.

26. The stage where you decide primary keys and relationships is called:

a) Conceptual Design

b) Logical Design

c) Physical Design

d) Data Backup

Answer: b

Explanation: Logical design defines keys and relationships in schema.

27. Before creating tables for student details, academic scores, and attendance, which step should be performed?

a) Write SQL Queries

b) Requirement Analysis

c) Index Creation

d) Backup Setup

Answer: b

Explanation: Requirement analysis identifies data needs before schema design.

28. Which DBMS component interprets SQL and finds the best execution plan?

a) Query Processor

b) Storage Manager

c) Transaction Manager

d) Buffer Manager

Answer: a

Explanation: Query processor parses and optimizes SQL statements.

29. In physical database design, the most important factor is:

a) Table naming conventions

b) Disk storage & indexing

c) Data normalization

d) User interface design

Answer: b

Explanation: Physical design focuses on efficient data storage and access.

30. Which step ensures database structure supports business rules and avoids redundancy?

a) Logical Design

b) Physical Design

c) Backup Planning

d) Query Optimization

Answer: a

Explanation: Logical design applies normalization and schema rules.

31. Which DBMS component ensures transactions complete fully or not at all?

a) Query Processor

b) Transaction Manager

c) Integrity Manager

d) Storage Manager

Answer: b

Explanation: Transaction manager enforces ACID properties.

32. A retail company identifies entities and relationships but not storage format yet. Which phase?

a) Conceptual Design

b) Logical Design

c) Physical Design

d) Testing Phase

Answer: a

Explanation: Conceptual design identifies entities without implementation details.

33. Which is NOT part of the storage manager’s responsibility?

a) Authorization checks

b) Managing disk space

c) Buffer management

d) File organization

Answer: a

Explanation: Authorization is handled by security, not storage manager.

34. Splitting 'Full Name' into 'First Name' and 'Last Name' applies which principle?

a) De-normalization

b) Normalization

c) Indexing

d) Sharding

Answer: b

Explanation: Normalization reduces redundancy by structuring data.

35. Which DBMS component translates user queries into low-level instructions?

a) Transaction Manager

b) Query Processor

c) Storage Manager

d) Data Dictionary

Answer: b

Explanation: Query processor converts SQL to machine-level operations.

36. In an airline reservation, which component prevents booking the same seat twice?

a) Transaction Manager

b) Integrity Manager

c) Storage Manager

d) Query Processor

Answer: b

Explanation: Integrity manager enforces unique constraints.

37. Data replication for fault tolerance relates mostly to which design stage?

a) Physical Design

b) Logical Design

c) Conceptual Design

d) Requirement Gathering

Answer: a

Explanation: Physical design deals with replication and storage.

38. If the buffer manager is inefficient, which component suffers?

a) Transaction Manager

b) Query Processor

c) Integrity Manager

d) Backup Manager

Answer: b

Explanation: Query processor depends on buffer manager for fast data access.

39. Creating indexes to speed up searches belongs to:

a) Conceptual Design

b) Logical Design

c) Physical Design

d) Requirement Analysis

Answer: c

Explanation: Indexing is part of physical design.

40. Which DBMS component facilitates audit history of changes?

a) Transaction Manager

b) Query Processor

c) Integrity Manager

d) Buffer Manager

Answer: a

Explanation: Transaction manager logs changes for rollback and audit.

41. Mapping 'Customer Orders' from ER diagram to tables with keys is:

a) Physical Design

b) Logical Design

c) Requirement Analysis

d) Testing Phase

Answer: b

Explanation: Logical design maps entities and relationships to tables.

42. A set of one or more attributes uniquely identifying a record is:

a) Candidate key

b) Sub key

c) Super key

d) Foreign key

Answer: c

Explanation: Super key is a superset of keys guaranteeing uniqueness.

43. Which attribute can be a super key among ID, CITY, NAME?

a) NAME

b) ID

c) CITY

d) CITY, ID

Answer: b

Explanation: ID uniquely identifies records.

44. A subset of a super key is a candidate key if:

a) No proper subset is a super key

b) All subsets are super keys

c) Subset is a super key

d) Each subset is a super key

Answer: a

Explanation: Candidate key has no smaller super key subsets.

45. A property of the entire relation ensuring uniqueness of tuples is called:

a) Rows

b) Key

c) Attribute

d) Fields

Answer: b

Explanation: Key ensures tuple uniqueness.

46. Given Projects(ProjectID, ProjectName, StartDate) with ProjectID as primary key, Tasks(TaskID, ProjectID, TaskName) with ProjectID as foreign key, the referencing table is:

a) Projects

b) Tasks

c) Both

d) Neither

Answer: b

Explanation: Table with foreign key references another.

47. The relation with primary key referenced by another relation is:

a) Referential relation

b) Referencing relation

c) Referenced relation

d) Referred relation

Answer: c

Explanation: Referenced relation contains primary key.

48. Tables in second normal form (2NF):

a) Eliminate hidden dependencies

b) Eliminate insertion anomalies

c) Have composite keys

d) Have non-key fields dependent on whole key

Answer: a

Explanation: 2NF removes partial dependencies from 1NF.

49. In 2NF, which is true?

a) No functional dependencies

b) No multivalued dependencies

c) No partial functional dependencies

d) No partial multivalued dependencies

Answer: c

Explanation: 2NF removes partial functional dependencies.

50. Relation Empdt1(empcode, name, street, city, state, pincode) with unique pin-state-city relation is in:

a) 1NF only

b) 2NF (and 1NF)

c) 3NF (and 2NF, 1NF)

d) BCNF (and 3NF, 2NF, 1NF)

Answer: b

Explanation: Relation meets 2NF criteria with no partial dependency on primary key.

51. In three-level ANSI/SPARC DBMS architecture, the level which provides physical data independence is:

A. External level

B. Conceptual level

C. Internal level

D. None

(GATE 2010)

Answer: B (Conceptual level)

Explanation: Conceptual schema shields user applications from changes in internal storage structures.

52. Which of the following statements about data abstraction is FALSE?

A. Physical level = data storage details

B. Conceptual level = logical structure of database

C. External level = one or more user views

D. Conceptual schema provides logical data independence

(GATE 2015 Set-2)

Answer: D

Explanation: Conceptual schema provides physical data independence, not logical.

53. A relationship set is said to be ternary if:

A. It involves three entity sets

B. It involves three attributes

C. It involves three composite keys

D. It involves three foreign keys

(GATE 2003)

Answer: A

Explanation: Ternary means a relationship among three entity sets.

54. Relation R(A,B,C,D) has candidate keys {A,B} and {C,D}. Which of the following is true?

A. AB and CD are superkeys

B. AC is a superkey

C. AD is a superkey

D. BC is a superkey

(GATE 2012)

Answer: A

Explanation: Candidate keys are always superkeys.

55. If a relation is in BCNF, it is also in:

A. 1NF only

B. 2NF and 3NF

C. 4NF always

D. None

(GATE 2000)

Answer: B

56. Which normal form uses multivalued dependency?

A. 2NF

B. 3NF

C. 4NF

D. BCNF

(GATE 2008)

Answer: C (4NF)

57. The order of database design steps is:

A. Logical → Physical → Conceptual

B. Requirement Analysis → Conceptual → Logical → Physical

C. Physical → Logical → Conceptual

D. Requirement → Physical → Conceptual → Logical

(GATE 2003)

Answer: B

58. In database design, denormalization is used to:

A. Reduce redundancy

B. Improve query efficiency

C. Enforce referential integrity

D. Improve normalization

(GATE 2017)

Answer: B

59. The DBMS component ensuring crash recovery and atomicity is:

A. Query Processor

B. Buffer Manager

C. Recovery Manager

D. Storage Manager

(GATE 2010)

Answer: C (Recovery Manager)

60. The Query Optimizer is part of:

A. Storage Manager

B. Recovery Manager

C. Query Processor

D. Transaction Manager

(GATE 2006)

Answer: C (Query Processor)

61. Which of the following is NOT a benefit of using a DBMS?

A. Reduces data redundancy

B. Enforces data integrity

C. Requires less hardware resources

D. Provides backup and recovery

(GATE 2007)

Answer: C

Explanation: DBMS requires more hardware resources due to software overhead.

62. Which is a major limitation of DBMS?

A. Slow access time compared to file system

B. High cost of hardware and software

C. Lack of data sharing

D. No security controls

(GATE 2001)

Answer: B

Explanation: DBMS setup and maintenance can be costly.

63. In ANSI-SPARC architecture, the conceptual schema is responsible for:

A. Physical storage details

B. User-specific views

C. Logical structure of entire database

D. Network communication

(GATE 2016)

Answer: C

64. Three level architecture provides:

A. Logical data independence

B. Physical data independence

C. Both A and B

D. Neither

(GATE 2011)

Answer: C

65. Which component of an ER diagram identifies weak entities?

A. Double rectangle

B. Double diamond

C. Double ellipse

D. Dashed diamond

(GATE 2005)

Answer: B

Explanation: Weak entities have a double diamond to identify relationships.

66. In ER model, participation of an entity set is called total if:

A. Every entity participates in at least one relationship

B. Only some entities participate

C. No entities participate

D. None of the above

(GATE 2004)

Answer: A

67. Which of the following is NOT a step in database design?

A. Requirement analysis

B. Logical design

C. Physical design

D. Algorithm design

(GATE 2014)

Answer: D

68. Denormalization is done to:

A. Reduce redundancy fully

B. Improve query performance

C. Reduce data inconsistencies

D. Normalize data further

(GATE 2018)

Answer: B

69. Logical design represents:

A. Physical data storage details

B. Conceptual view of data

C. Program implementation details

D. Network layout

(GATE 2009)

Answer: B

70. The transaction manager ensures:

A. Efficient query processing

B. Atomicity and concurrency control

C. Backup and recovery

D. User authentication

(GATE 2013)

Answer: B

71. Buffer manager is responsible for:

A. Managing data stored on disk

B. Managing memory pages exchanged between disk and main memory

C. Query parsing

D. Transaction scheduling

(GATE 2010)

Answer: B

72. Query processor includes all except:

A. Parser

B. Optimizer

C. Executor

D. Backup handler

(GATE 2017)

Answer: D

73. Which key uniquely identifies every tuple in a relation?

A. Candidate key

B. Foreign key

C. Primary key

D. Composite key

(GATE 2011)

Answer: C

74. A candidate key that is not primary is called:

A. Alternate key

B. Foreign key

C. Composite key

D. Surrogate key

(GATE 2006)

Answer: A

75. First Normal Form (1NF) requires:

A. No partial dependencies

B. Atomic attribute values

C. No transitive dependencies

D. No multivalued dependencies

(GATE 2013)

Answer: B

76. A relation with no partial dependency is in:

A. 1NF

B. 2NF

C. 3NF

D. BCNF

(GATE 2008)

Answer: B

77. Which normal form removes transitive dependency?

A. 1NF

B. 2NF

C. 3NF

D. BCNF

(GATE 2015)

Answer: C

78. Closure of a set of functional dependencies is denoted by:

A. F+

B. F

C. F

D. Fc

(GATE 2004)

Answer: A

79. Boyce-Codd Normal Form (BCNF) is a stronger version of:

A. 1NF

B. 2NF

C. 3NF

D. 4NF

(GATE 2014)

Answer: C

80. A relation containing multi-valued dependencies can be decomposed into:

A. 1NF relations

B. BCNF relations

C. 4NF relations

D. 5NF relations

(GATE 2010)

Answer: C

81. Which of the following is NOT true about normalization?

A. It eliminates redundancy

B. It improves query speed always

C. It removes anomalies

D. It ensures data integrity

(GATE 2002)

Answer: B

Explanation: Normalization may degrade query performance due to joins.

82. In normalization, lossless join means:

A. No loss of information when relations are decomposed

B. No redundancy in data

C. Increasing query speed

D. No foreign keys required

(GATE 2001)

Answer: A

83. Transitive dependency is:

A. $A \rightarrow B$ and $B \rightarrow C$ implies $A \rightarrow C$

B. Partial dependency only

C. Functional dependency with multiple keys

D. Multivalued dependency

(GATE 2017)

Answer: A

84. The highest normal form which addresses join dependency is:

A. 4NF

B. 5NF

C. BCNF

D. 3NF

(GATE 2016)

Answer: B