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| 1. Normalization works through a series of stages called normal forms.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 2. Normalization is a process that is used for changing attributes to entities.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 3. In order to meet performance requirements, portions of the database design may need to be occasionally denormalized.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 4. Denormalization produces a lower normal form.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 5. The objective of normalization is to ensure that each table conforms to the concept of well-formed relations.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 6. Relational models view data as part of a table or collection of tables in which all key values must be identified.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 7. Repeating groups must be eliminated by ensuring that each row defines a single entity.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 8. A dependency of one nonprime attribute on another nonprime attribute is a partial dependency.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 9. Dependency diagrams are very helpful in getting a bird’s-eye view of all the relationships among a table’s attributes.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 10. Dependencies that are based on only a part of a composite primary key are called transitive dependencies.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 11. All relational tables satisfy the 1NF requirements.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 12. In the context of partial dependencies, data redundancies occur because every row entry requires duplication of data.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 13. Since a partial dependency can exist only if a table's primary key is composed of several attributes, if a table in 1NF has a single-attribute primary key, then the table is automatically in 2NF.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3b Conversion to Second Normal Form (2NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 14. It is possible for a table in 2NF to exhibit transitive dependency, where the primary key may rely on one or more nonprime attributes to functionally determine other nonprime attributes.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3b Conversion to Second Normal Form (2NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 15. Data stored at their highest level of granularity are said to be atomic data.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 16. A table is in BCNF if every determinant in the table is a foreign key.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-6a The Boyce-Codd Normal Form | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 17. A table is in fourth normal form if it is in third normal form and has no independent multivalued dependencies.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-6b Fourth Normal Form (4NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 18. Normalization represents a micro view of the entities within the ERD.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-7 Normalization and Database Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 19. The combination of normalization and ER modeling yields a useful ERD, whose entities can be translated into appropriate table structures.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-7 Normalization and Database Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 20. Normalization purity is often easy to sustain in the modern database environment.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-8 Denormalization | | *LEARNING OBJECTIVES:* | 06.05 - Identify situations that require denormalization to generate information efficiently | |

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| Multiple Choice |

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| 21. From a structural point of view, 3NF is better than \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 2NF | b. | 3NF | |  | c. | 5NF | d. | 6NF |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 22. Normalization works through a series of stages called normal forms. For most purposes in business database design, \_\_\_\_\_ stages are as high as you need to go in the normalization process.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | two | b. | three | |  | c. | four | d. | five |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 23. From a structural point of view, 2NF is better than \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 3NF | |  | c. | 4NF | d. | BCNF |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 24. An attribute that is part of a key is known as a(n) \_\_\_\_\_ attribute.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | important | b. | nonprime | |  | c. | prime | d. | entity |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 25. Attribute A \_\_\_\_\_ attribute B if all of the rows in the table that agree in value for attribute A also agree in value for attribute B.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | determines | b. | derives from | |  | c. | controls | d. | owns |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 26. Some very specialized applications may require normalization beyond the \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 2NF | |  | c. | 3NF | d. | 4NF |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 27. Of the following normal forms, \_\_\_\_\_ is mostly of theoretical interest.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 3NF | |  | c. | BCNF | d. | DKNF |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 28. A table that has all key attributes defined, has no repeating groups, and all its attributes are dependent on the primary key is said to be in \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 2NF | |  | c. | 3NF | d. | 4NF |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.02 - Identify and describe each of the normal forms: 1NF, 2NF, 3NF, BCNF, and 4NF | |

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| 29. A(n) \_\_\_\_\_ exists when there are functional dependencies such that Y is functionally dependent on X, Z is functionally dependent on Y, and X is the primary key.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | partial dependency | b. | repeating group | |  | c. | atomic attribute | d. | transitive dependency |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 30. A \_\_\_\_\_ derives its name from the fact that a collection of multiple entries of the same type can exist for any single key attribute occurrence.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | partial dependency | b. | transitive dependency | |  | c. | repeating group | d. | primary key |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 31. A relational table must not contain a(n) \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | entity | b. | attribute | |  | c. | relationship | d. | repeating group |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 32. In a(n) \_\_\_\_\_ diagram, the arrows above the attributes indicate all desirable dependencies.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Chen | b. | dependency | |  | c. | functionality | d. | ER |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 33. Dependencies based on only a part of a composite primary key are known as \_\_\_\_\_ dependencies.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | primary | b. | partial | |  | c. | incomplete | d. | composite |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 34. If a table has multiple candidate keys and one of those candidate keys is a composite key, the table can have \_\_\_\_\_ based on this composite candidate key even when the primary key chosen is a single attribute.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Boyce-Codd normal forms | b. | redundancies | |  | c. | time-variances | d. | partial dependencies |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3c Conversion to Third Normal Form (3NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 35. A table that is in 2NF and contains no transitive dependencies is said to be in \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 2NF | |  | c. | 3NF | d. | 4NF |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3c Conversion to Third Normal Form (3NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 36. Improving \_\_\_\_\_ leads to more flexible queries.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | atomicity | b. | normalization | |  | c. | denormalization | d. | derived attribute |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 37. An atomic attribute \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | cannot exist in a relational table | b. | cannot be further subdivided | |  | c. | displays multiplicity | d. | is always chosen to be a foreign key |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 38. The most likely data type for a surrogate key is \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | character | b. | date | |  | c. | logical | d. | numeric |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 39. Granularity refers to \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | the size of a table | b. | the level of detail represented by the values in a table's row | |  | c. | the number of attributes represented in a table | d. | the number of rows in a table |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 40. From a system functionality point of view, \_\_\_\_\_ attribute values can be calculated when they are needed to write reports or invoices.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | derived | b. | atomic | |  | c. | granular | d. | historical |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 41. In a real-world environment, we must strike a balance between design integrity and \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | robustness | b. | flexibility | |  | c. | uniqueness | d. | ease of use |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-5 Surrogate Key Considerations | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 42. To generate a surrogate key, Microsoft Access uses a(n) \_\_\_\_\_ data type.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | character | b. | sequence | |  | c. | AutoNumber | d. | identity |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-5 Surrogate Key Considerations | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 43. BCNF can be violated only if the table contains more than one \_\_\_\_\_ key.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | primary | b. | candidate | |  | c. | foreign | d. | secondary |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-6a The Boyce-Codd Normal Form | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 44. When a table contains only one candidate key, \_\_\_\_\_ are considered to be equivalent.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | the 1NF and the 2NF | b. | the 3NF and the BCNF | |  | c. | the 4NF and the 3NF | d. | the BCNF and the DKNF |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-6a The Boyce-Codd Normal Form | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 45. In a \_\_\_\_\_ situation, one key determines multiple values of two other attributes and those attributes are independent of each other.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | multivalued dependency | b. | transitive dependency | |  | c. | partial dependency | d. | functional dependency |  |  |  | | --- | --- | | *ANSWER:* | a | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-6b Fourth Normal Form (4NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 46. A table where all attributes are dependent on the primary key but are independent of each other, and no row contains two or more multivalued facts about an entity is said to be in \_\_\_\_\_.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 2NF | |  | c. | 3NF | d. | 4NF |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-6b Fourth Normal Form (4NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 47. A table is in 4NF if it is in 3NF, and \_\_\_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | all attributes must be dependent on the primary key and must be dependent on each other | |  | b. | all attributes are unrelated | |  | c. | it has no multivalued dependencies | |  | d. | no column contains the same values |  |  |  | | --- | --- | | *ANSWER:* | c | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.02 - Identify and describe each of the normal forms: 1NF, 2NF, 3NF, BCNF, and 4NF | |

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| 48. An example of denormalization is using a \_\_\_\_\_ denormalized table to hold report data. This is required when creating a tabular report in which the columns represent data that are stored in the table as rows.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | transitive | b. | 3NF | |  | c. | component | d. | temporary |  |  |  | | --- | --- | | *ANSWER:* | d | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-8 Denormalization | | *LEARNING OBJECTIVES:* | 06.05 - Identify situations that require denormalization to generate information efficiently | |

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| 49. Data warehouse routinely uses \_\_\_\_\_ structures in its complex, multilevel, multisource data environment.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | 1NF | b. | 2NF | |  | c. | 3NF | d. | 4NF |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-8 Denormalization | | *LEARNING OBJECTIVES:* | 06.05 - Identify situations that require denormalization to generate information efficiently | |

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| 50. \_\_\_\_\_ databases reflect the ever-growing demand for greater scope and depth in the data on which decision support systems increasingly rely.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | a. | Normalized | b. | Data warehouse | |  | c. | Temporary | d. | Report |  |  |  | | --- | --- | | *ANSWER:* | b | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-8 Denormalization | | *LEARNING OBJECTIVES:* | 06.05 - Identify situations that require denormalization to generate information efficiently | |

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| 51. If database tables are treated as though they were files in a file system, the \_\_\_\_\_ never has a chance to demonstrate its superior data-handling capabilities.   |  |  | | --- | --- | | *ANSWER:* | RDBMS  relational database management system  relational database management system (RDBMS)  RDBMS (relational database management system) | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 52. The price paid for increased performance through denormalization is a larger amount of \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | redundancy  data redundancy | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 53. A dependency based on only a part of a composite primary key is called a(n) \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | partial dependency | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 54. In order to meet \_\_\_\_\_ requirements, you may have to denormalize some portions of a database design.   |  |  | | --- | --- | | *ANSWER:* | performance | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 55. \_\_\_\_\_ is a process to help reduce the likelihood of data anomalies.   |  |  | | --- | --- | | *ANSWER:* | Normalization | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 56. Any attribute that is at least part of a key is known as a(n) \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | prime attribute  key attribute | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 57. When designing a new database structure based on the business requirements of the end users, the database designer will construct a data model using a technique such as \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | Crow's Foot notation ERDs | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-2 The Need for Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 58. The \_\_\_\_\_ is central to a discussion of normalization.   |  |  | | --- | --- | | *ANSWER:* | concept of keys | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 59. All relational tables satisfy the \_\_\_\_\_ requirements.   |  |  | | --- | --- | | *ANSWER:* | 1NF  first normal form  first normal form (1NF)  1NF (first normal form) | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.02 - Identify and describe each of the normal forms: 1NF, 2NF, 3NF, BCNF, and 4NF | |

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| 60. Because a partial dependency can exist only when a table's primary key is composed of several attributes, a table whose \_\_\_\_\_ key consists of only a single attribute is automatically in 2NF once it is in 1NF.   |  |  | | --- | --- | | *ANSWER:* | primary | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3b Conversion to Second Normal Form (2NF) | | *LEARNING OBJECTIVES:* | 06.02 - Identify and describe each of the normal forms: 1NF, 2NF, 3NF, BCNF, and 4NF | |

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| 61. Any attribute whose value determines other values within a row is known as a(n) \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | determinant | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-3c Conversion to Third Normal Form (3NF) | | *LEARNING OBJECTIVES:* | 06.02 - Identify and describe each of the normal forms: 1NF, 2NF, 3NF, BCNF, and 4NF | |

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| 62. An attribute that cannot be further subdivided is said to display \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | atomicity | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 63. \_\_\_\_\_ refers to the level of detail represented by the values stored in a table's row.   |  |  | | --- | --- | | *ANSWER:* | Granularity | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 64. In a real-world environment, changing granularity requirements might dictate changes in primary key selection, and those changes might ultimately require the use of \_\_\_\_\_ keys.   |  |  | | --- | --- | | *ANSWER:* | surrogate | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-4 Improving the Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 65. It becomes difficult to create a suitable \_\_\_\_\_ key when the related table uses a composite primary key.   |  |  | | --- | --- | | *ANSWER:* | foreign | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-5 Surrogate Key Considerations | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 66. In the \_\_\_\_\_, no row may contain two or more multivalued facts about an entity.   |  |  | | --- | --- | | *ANSWER:* | 4NF  fourth normal form  fourth normal form (4NF)  4NF (fourth normal form) | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-6b Fourth Normal Form (4NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 67. An ERD is created through a(n) \_\_\_\_\_ process.   |  |  | | --- | --- | | *ANSWER:* | iterative | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-7 Normalization and Database Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 68. The combination of \_\_\_\_\_ and ER modeling yields a useful ERD, whose entities may now be translated into appropriate table structures.   |  |  | | --- | --- | | *ANSWER:* | normalization | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-7 Normalization and Database Design | | *LEARNING OBJECTIVES:* | 06.04 - Apply normalization rules to evaluate and correct table structures | |

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| 69. Unnormalized tables yield no simple strategies for creating virtual tables known as \_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | views | | *DIFFICULTY:* | Difficulty:Easy | | *REFERENCES:* | 6-8 Denormalization | | *LEARNING OBJECTIVES:* | 06.05 - Identify situations that require denormalization to generate information efficiently | |

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| 70. According to the data-modeling checklist, \_\_\_\_\_ should be nouns that are familiar to business, should be short and meaningful, and should document abbreviations, synonyms, and aliases for each entity.   |  |  | | --- | --- | | *ANSWER:* | entity names | | *DIFFICULTY:* | Difficulty: Easy | | *REFERENCES:* | 6-9 Data-Modeling Checklist | | *LEARNING OBJECTIVES:* | 06.06 - Use a data-modeling checklist to check that the ERD meets a set of minimum requirements | |

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| 71. Explain normalization and its different forms.   |  |  | | --- | --- | | *ANSWER:* | Normalization is a process for evaluating and correcting table structures to minimize data redundancies, thereby reducing the likelihood of data anomalies. The normalization process involves assigning attributes to tables based on the concept of determination. Normalization works through a series of stages called normal forms. The first three stages are described as first normal form (1NF), second normal form (2NF), and third normal form (3NF). From a structural point of view, 2NF is better than 1NF, and 3NF is better than 2NF. For most purposes in business database design, 3NF is as high as you need to go in the normalization process. However, you will discover that properly designed 3NF structures also meet the requirements of fourth normal form (4NF). | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-1 Database Tables and Normalization | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 72. What characteristics do tables that conform to the concept of well-informed relations have?   |  |  | | --- | --- | | *ANSWER:* | Tables that conform to the concept of well-informed relations have the following characteristics:   1. Each table represents a single subject. 2. No data item will be unnecessarily stored in more than one table. This results in tables that have lower redundancies. The reason for this requirement is to ensure that the data is updates in only one place. 3. All nonprime attributes in a table are dependent on the primary key alone. The reason for this requirement is to ensure that the data is uniquely identifiable by a primary key value. 4. Each table is void of insertion, update, or deletion anomalies, which ensure the integrity and consistency of the data. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3 The Normalization Process | | *LEARNING OBJECTIVES:* | 06.01 - Explain normalization and its role in the database design process | |

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| 73. Describe a dependency diagram and explain its purpose.   |  |  | | --- | --- | | *ANSWER:* | Dependency diagrams are very helpful in getting a bird’s eye view of all the relationships among a table’s attributes, and their use makes it less likely that you will overlook an important dependency.  The following are features of a dependency diagram:   1. The primary key attributes are bold, underlined, and shaded in a different color. 2. The arrows above the attributes indicate all desirable dependencies—that is, dependencies based on the primary key. 3. The arrows below the dependency diagram indicate less desirable dependencies. Two types of such dependencies exist: a. Partial dependencies. A dependency based on only a part of a composite primary key is a partial dependency. b. Transitive dependencies. A transitive dependency is a dependency of one nonprime attribute on another nonprime attribute. The problem with transitive dependencies is that they still yield data anomalies. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3a Conversion to First Normal Form (1NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 74. What steps are involved in the conversion to third normal form?   |  |  | | --- | --- | | *ANSWER:* | Step 1: Make New Tables to Eliminate Transitive Dependencies  For every transitive dependency, write a copy of its determinant as a primary key for a new table. A determinant is any attribute whose value determines other values within a row. If you have three different transitive dependencies, you will have three different determinants. As with the conversion to 2NF, it is important for the determinant remain in the original table to serve as a foreign key.  Step 2: Reassign Corresponding Dependent Attributes  Identify the attributes that are dependent on each determinant identified in Step 1. Place the dependent attributes in the new tables with their determinants and remove them from their original tables. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-3c Conversion to Third Normal Form (3NF) | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |

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| 75. Explain the Boyce-Codd normal form (BCNF). How is it related to other normal forms?   |  |  | | --- | --- | | *ANSWER:* | A table is in Boyce-Codd normal form (BCNF) when every determinant in the table is a candidate key. A candidate key has the same characteristics as a primary key, but for some reason, it was not chosen to be the primary key. Clearly, when a table contains only one candidate key, the 3NF and the BCNF are equivalent. In other words, BCNF can be violated only when the table contains more than one candidate key. Most designers consider the BCNF to be a special case of the 3NF. In fact, if the techniques shown in this chapter are used, most tables conform to the BCNF requirements once the 3NF is reached. | | *DIFFICULTY:* | Difficulty: Moderate | | *REFERENCES:* | 6-6a The Boyce-Codd Normal Form | | *LEARNING OBJECTIVES:* | 06.03 - Explain how normal forms can be transformed from lower normal forms to higher normal forms | |