**1. Design Engineering: Design Concepts and Model**

**Q1:** Which of the following is NOT a fundamental design concept in software engineering?  
A) Abstraction  
B) Modularity  
C) Redundancy  
D) Information Hiding

**Answer:** C) Redundancy

**Q2:** What is the primary purpose of the design model in software engineering?  
A) To ensure the software runs faster  
B) To provide a blueprint for implementation  
C) To eliminate the need for testing  
D) To define only the user interface

**Answer:** B) To provide a blueprint for implementation

**Q3:** Which of the following best describes a **modular design**?  
A) A system with a large, single monolithic module  
B) A system divided into independent, interacting components  
C) A design that does not follow any architectural principles  
D) A system where each module shares global data freely

**Answer:** B)

**2. Data Design**

**Q4:** In data design, which of the following is a key objective?  
A) Increasing code complexity  
B) Reducing data redundancy  
C) Avoiding data abstraction  
D) Eliminating all relational databases

**Answer:** B) Reducing data redundancy

**Q5:** What does **normalization** aim to achieve in database design?  
A) Increase data redundancy  
B) Improve data security  
C) Organize data to reduce redundancy and improve consistency  
D) Create complex relationships between tables

**Answer:** C)

**3. Architectural Design**

**Q6:** What is the primary purpose of architectural design in software engineering?  
A) To define the user interface  
B) To establish the overall structure of a software system  
C) To write detailed source code  
D) To test the performance of the system

**Answer:** B)

**Q7:** Which of the following is NOT a quality attribute considered in architectural design?  
A) Maintainability  
B) Performance  
C) Cost of development  
D) Scalability

**Answer:** C) Cost of development

**Q8:** In software architecture, the term **"separation of concerns"** primarily refers to:  
A) Writing all software components in the same module  
B) Dividing a system into distinct sections, each handling a specific functionality  
C) Using a single database for all services  
D) Reducing system security concerns

**Answer:** B)

**Q9:** In **Component-Based Software Architecture**, a component should ideally:  
A) Depend on multiple other components to function  
B) Have a well-defined interface and be reusable  
C) Be tightly coupled with other components  
D) Require direct database access

**Answer:** B)

**4. Designing Class-Based Components**

**Q10:** In object-oriented design, which principle ensures that a class should only have one reason to change?  
A) Open/Closed Principle  
B) Single Responsibility Principle  
C) Interface Segregation Principle  
D) Dependency Inversion Principle

**Answer:** B)

**Q11:** What is the main advantage of using **inheritance** in class-based design?  
A) It reduces the need for polymorphism  
B) It allows code reusability and hierarchical classification  
C) It eliminates the need for object instantiation  
D) It makes the software difficult to maintain

**Answer:** B)

**Q12:** Which of the following statements about **encapsulation** is TRUE?  
A) Encapsulation allows direct access to an object's internal state  
B) Encapsulation is unrelated to object-oriented programming  
C) Encapsulation helps restrict access to certain details of an object  
D) Encapsulation makes classes less reusable

**Answer:** C)

**Q13:** **Which of the following design concepts helps in reducing system complexity by dividing it into smaller, manageable parts?**  
A) Concurrency  
B) Modularity  
C) Cohesion  
D) Coupling

**Answer:** B) Modularity

**Q14:** **The degree of interdependence between modules in a software system is known as:**  
A) Abstraction  
B) Cohesion  
C) Coupling  
D) Composition

**Answer:** C) Coupling

**Q15:** **A software module with high cohesion is expected to:**  
A) Perform multiple unrelated tasks  
B) Have a strong focus on a single well-defined function  
C) Depend on many external modules  
D) Contain a large number of global variables

**Answer:** B)

**Q16:** **Which design model represents the static structure of a system?**  
A) Data Flow Diagram (DFD)  
B) State Transition Diagram (STD)  
C) Class Diagram  
D) Sequence Diagram

**Answer:** C) Class Diagram

**Q17:** **Which design model is used to represent the dynamic behavior of a system?**  
A) Entity-Relationship Diagram (ERD)  
B) State Transition Diagram (STD)  
C) Class Diagram  
D) Flowchart

**Answer:** B) State Transition Diagram (STD)

**Q18:** **Which of the following is NOT a type of design model in software engineering?**  
A) Component-Level Design Model  
B) Deployment Model  
C) Compilation Model  
D) Process Model

**Answer:** C)

**Q19:** **The principle of information hiding in software design helps in:**  
A) Increasing module interdependence  
B) Reducing the impact of changes in one module on others  
C) Making all functions globally accessible  
D) Reducing the need for testing

**Answer:** B)

**Q20:** **Which of the following is a characteristic of a well-designed module?**  
A) High coupling and low cohesion  
B) High cohesion and low coupling  
C) Low abstraction and high redundancy  
D) Strong dependency on global variables

**Answer:** B)

**Q21:** **Which of the following describes "Refactoring" in software design?**  
A) Redesigning the entire software system from scratch  
B) Improving existing code structure without changing functionality  
C) Adding new features without modifying existing code  
D) Converting procedural code to object-oriented code

**Answer:** B)

**Q22:** **Which software design principle states that a module should be open for extension but closed for modification?**  
A) Single Responsibility Principle  
B) Open/Closed Principle  
C) Dependency Inversion Principle  
D) Interface Segregation Principle

**Answer:** B)

**Q23:** **What is the primary purpose of design patterns in software engineering?**  
A) To make code run faster  
B) To provide reusable solutions to common design problems  
C) To avoid the use of object-oriented programming  
D) To replace the need for modular design

**Answer:** B)

**Q24:** **Which of the following statements about software architecture and design is correct?**  
A) Design deals with implementation details, while architecture focuses on high-level structure  
B) Architecture and design are completely independent of each other  
C) Design is only concerned with non-functional requirements  
D) Design is optional in software development

**Answer:** A)

### ****Q25:**** What is the primary goal of User Interface (UI) design?

A) Making the software complex for users  
B) Enhancing user experience and usability  
C) Focusing only on backend functionality  
D) Ignoring user preferences

**Answer:** B)

### ****Q26:**** Which of the following is NOT a principle of effective UI design?

A) Consistency  
B) Simplicity  
C) Complexity  
D) Feedback

**Answer:** C

### ****Q27:**** ****Which of the following best defines "User-Centered Design" (UCD)?****

A) Designing the interface based on developer preferences  
B) Ignoring user feedback and usability testing  
C) Designing interfaces by considering users' needs, goals, and behaviors  
D) Focusing only on aesthetic appeal, not functionality

**Answer:** C)

### ****Q28:**** ****Which phase of UI design focuses on identifying user needs and expectations?****

A) Interface Design  
B) User Analysis  
C) UI Implementation  
D) UI Testing

**Answer:** B)

### ****Q29:**** ****What is the purpose of Interface Analysis?****

A) To determine how different system components interact  
B) To design graphical elements for the UI  
C) To increase system response time  
D) To remove all forms of user interaction

**Answer:** A)

### ****Q30:**** ****Which of the following is an essential aspect of interface analysis?****

A) Understanding user interactions with the system  
B) Ignoring system requirements  
C) Developing backend algorithms  
D) Avoiding feedback from users

**Answer:** A)

### ****Q31:**** ****Which of these is a key factor in designing an effective user interface?****

A) High cognitive load  
B) Low accessibility  
C) Clear and consistent navigation  
D) Excessive pop-ups and animations

**Answer:** C)

### ****Q32:**** ****Which interface type is commonly used in voice assistants like Siri and Alexa?****

A) Command Line Interface (CLI)  
B) Natural Language Interface (NLI)  
C) Graphical User Interface (GUI)  
D) Menu-driven Interface

**Answer:** B)

### ****Q33:**** ****Which of the following is a principle of good interface design?****

A) Keeping the interface cluttered  
B) Using inconsistent design elements  
C) Providing immediate and clear feedback  
D) Ignoring user expectations

**Answer:** C)

### ****Q34:**** ****Which UI design principle ensures that users can predict the outcome of their actions?****

A) Visibility  
B) Error Prevention  
C) Feedback  
D) Consistency

**Answer:** A) Visibility

### ****Q35:**** ****Which of the following is an example of a "Direct Manipulation" interface?****

A) Command-line interface  
B) Drag-and-drop functionality in a GUI  
C) Text-based menu navigation  
D) Using keyboard shortcuts only

**Answer:** B)

### ****Q36:**** Which of the following types of coupling is the ****most desirable**** in software design?

A) Data Coupling  
B) Control Coupling  
C) Common Coupling  
D) Content Coupling

**Answer:** A)

### ****Q37:**** ****Which type of coupling is the worst and should be avoided?****

A) Data Coupling  
B) Stamp Coupling  
C) Control Coupling  
D) Content Coupling

**Answer:** D)

### ****Q38:**** ****In which type of coupling does one module modify the internal working of another module?****

A) Common Coupling  
B) Control Coupling  
C) Content Coupling  
D) Stamp Coupling

**Answer:** C)

### ****Q39:**** ****Which of the following types of coupling occurs when modules share a common global variable?****

A) Data Coupling  
B) Control Coupling  
C) Common Coupling  
D) Stamp Coupling

**Answer:** C)

### ****Q40:**** ****Which type of coupling occurs when one module passes a data structure to another, and the receiving module uses only part of it?****

A) Content Coupling  
B) Stamp Coupling  
C) Common Coupling  
D) Data Coupling

**Answer:** B)

### ****Q41:**** ****Which type of coupling occurs when one module passes control information (flags or switches) to another module?****

A) Data Coupling  
B) Control Coupling  
C) Stamp Coupling  
D) Content Coupling

**Answer:** B)

### ****Q42:**** ****Which type of coupling is the best in terms of maintainability and reusability?****

A) Common Coupling  
B) Stamp Coupling  
C) Data Coupling  
D) Control Coupling

**Answer:** C)

### ****Q43:**** ****Which type of coupling occurs when two modules share only the necessary data via parameters?****

A) Stamp Coupling  
B) Control Coupling  
C) Data Coupling  
D) Content Coupling

**Answer:** C)

### ****Q44:**** ****Which type of cohesion is the best and most desirable in software design?****

A) Functional Cohesion  
B) Logical Cohesion  
C) Coincidental Cohesion  
D) Temporal Cohesion

**Answer:** A)

### ****Q45:**** ****Which type of cohesion occurs when a module performs multiple unrelated tasks?****

A) Sequential Cohesion  
B) Coincidental Cohesion  
C) Communicational Cohesion  
D) Functional Cohesion

**Answer:** B)

### ****Q46:**** ****Which type of cohesion occurs when tasks in a module are related by their execution time?****

A) Procedural Cohesion  
B) Sequential Cohesion  
C) Temporal Cohesion  
D) Logical Cohesion

**Answer:** C)

### ****Q47:**** ****Which type of cohesion occurs when elements in a module are grouped because they are always executed together in a specific order?****

A) Logical Cohesion  
B) Procedural Cohesion  
C) Coincidental Cohesion  
D) Communicational Cohesion

**Answer:** B)

### ****Q48:**** ****Which type of cohesion is characterized by multiple elements performing operations on the same data?****

A) Logical Cohesion  
B) Communicational Cohesion  
C) Temporal Cohesion  
D) Functional Cohesion

**Answer:** B)

### ****Q49:**** ****Which of the following types of cohesion is the worst and should be avoided?****

A) Logical Cohesion  
B) Procedural Cohesion  
C) Coincidental Cohesion  
D) Functional Cohesion

**Answer:** C)

### ****Q50:**** ****Which of the following types of cohesion occurs when a module contains functions that are related logically, but the choice of function is determined by a control flag?****

A) Logical Cohesion  
B) Sequential Cohesion  
C) Functional Cohesion  
D) Communicational Cohesion

**Answer:** A)

### ****Q51:**** ****Which type of cohesion occurs when the output of one function serves as input for another within the same module?****

A) Logical Cohesion  
B) Procedural Cohesion  
C) Sequential Cohesion  
D) Functional Cohesion

**Answer:** C)