**SER 315 Software Engineering Multiple Choice Questions**

**Week 1: Engineering Design Process and Class Diagrams**

**1. True or False: Design problems have one solution.**

* A) True
* B) False

**Answer: B) False**

**2. What are the advantages of a formal design process?**

* A) It makes design decisions explicit
* B) Allows for greater documentation
* C) Reduces the likelihood that important issues are forgotten or overlooked
* D) All of the above

**Answer: D) All of the above**

**3. What are Class Diagrams?**

* A) Behavioral models showing system functionality
* B) Interaction models showing message exchanges
* C) Structural models with varying levels of abstraction
* D) Process models showing workflow

**Answer: C) Structural models with varying levels of abstraction**

**4. What are the different types of Design Patterns?**

* A) Creational, Structural, and Behavioral
* B) Abstract, Interface, and Implementation
* C) Singleton, Factory, and Adapter
* D) Layered, Blackboard, and Microkernel

**Answer: A) Creational, Structural, and Behavioral**

**Week 2: Use Case and Sequence Diagrams**

**5. What kind of diagram is a Use Case Diagram?**

* A) Structural diagram
* B) Behavior diagram
* C) Interaction diagram
* D) Implementation diagram

**Answer: B) Behavior diagram**

**6. What kind of model is a Sequence Diagram?**

* A) Structural model
* B) Behavior model
* C) Interaction model
* D) Implementation model

**Answer: C) Interaction model**

**7. What are the main components of Use Case Diagrams?**

* A) Classes, attributes, methods, and associations
* B) Actions, transitions, forks, and joins
* C) Use cases, actors, scenarios, and associations
* D) Layers, boundaries, interfaces, and controllers

**Answer: C) Use cases, actors, scenarios, and associations**

**Week 3: Activity Diagrams, UI Design, and System Class Models**

**8. What are Activity Diagrams?**

* A) Structural models that show class relationships
* B) Behavioral models that refine activities and their flow
* C) Interaction models showing message passing
* D) Static models of system architecture

**Answer: B) Behavioral models that refine activities and their flow**

**9. What are the 3 layers of the System Class Model?**

* A) Model, View, Controller
* B) User, System, Database
* C) Input, Process, Output
* D) Presentation (Boundary), Application (Control), Data (Entity)

**Answer: D) Presentation (Boundary), Application (Control), Data (Entity)**

**10. Which of the following is NOT an element in an Activity Diagram?**

* A) Actions
* B) Transitional arrows
* C) Message calls
* D) Swim lanes

**Answer: C) Message calls**

**Week 4: Formalization and Z-Notation**

**11. What is Design by Contract?**

* A) A legal agreement between developers and clients
* B) A statement that if preconditions are met, the component should fulfill post conditions
* C) A pattern for designing interfaces
* D) A method for estimating development costs

**Answer: B) A statement that if preconditions are met, the component should fulfill post conditions**

**12. Why are formal methods vital in safety critical systems?**

* A) They reduce development time
* B) They provide precision and verification of correctness
* C) They are required by law
* D) They improve user experience

**Answer: B) They provide precision and verification of correctness**

**13. What is Z-notation used for?**

* A) Database schema design
* B) User interface specification
* C) A formalization language used in Operational patterns
* D) Network protocol definition

**Answer: C) A formalization language used in Operational patterns**

**14. Which of the following is NOT a Z Notation operator?**

* A) ∈ (element of)
* B) ∪ (union)
* C) ∩ (intersection)
* D) % (modulo)

**Answer: D) % (modulo)**

**15. What is the purpose of formal specification in Software Engineering?**

* A) To increase development speed
* B) To remove ambiguity and allow verification of correctness
* C) To improve user interface design
* D) To reduce memory requirements

**Answer: B) To remove ambiguity and allow verification of correctness**

**Week 5: Operational Patterns**

**16. From which documentation source is the "Reads/Changes" component of an Operational Pattern derived?**

* A) Requirements
* B) Sequence Diagrams
* C) System Class Model
* D) Activity Diagrams

**Answer: C) System Class Model**

**17. What does the implicit keyword mean?**

* A) The operation is optional
* B) The existence of an object from reads/changes is expected
* C) The operation must be implemented by derived classes
* D) The function is private

**Answer: B) The existence of an object from reads/changes is expected**

**18. What does the post-condition tell us?**

* A) Requirements that must be met before operation
* B) How the system state changes after the operation
* C) When the operation is called
* D) Who can access the operation

**Answer: B) How the system state changes after the operation**

**Week 6: Communication Diagrams**

**19. What kind of model is a Communication diagram?**

* A) Structural model
* B) Behavioral model
* C) Interaction model
* D) Implementation model

**Answer: C) Interaction model**

**20. What keyword does a Communication diagram use to create an instance of an object?**

* A) new
* B) create
* C) instance
* D) construct

**Answer: B) create**

**21. What are Communication diagrams primarily used to describe?**

* A) Class hierarchies
* B) Process workflows
* C) Object communication within a feature/scenario
* D) Data structures

**Answer: C) Object communication within a feature/scenario**

**Week 7: Design Patterns and Architectural Styles**

**22. Which is NOT a constraint of a layered system?**

* A) Layers cannot be skipped
* B) Each layer must have distinct responsibilities
* C) Layers should only be dependent on ones below it
* D) Each layer must contain exactly three classes

**Answer: D) Each layer must contain exactly three classes**

**23. What Design pattern would you use if you had a resource and wanted to ensure only one instance of it existed?**

* A) Factory
* B) Singleton
* C) Observer
* D) Decorator

**Answer: B) Singleton**

**24. What is an anti-pattern?**

* A) A design pattern that solves complex problems
* B) A programming mistake that gets repeated
* C) A method for detecting bugs
* D) A tool for refactoring code

**Answer: B) A programming mistake that gets repeated**

**25. Which is NOT a design pattern mentioned in the review material?**

* A) Composite
* B) Decorator
* C) Template Method
* D) Observer

**Answer: C) Template Method**

**26. Which architectural style is NOT mentioned in the review material?**

* A) Layered systems
* B) Blackboard
* C) Client-server
* D) Microkernel

**Answer: C) Client-server**