**Assignment No-2 [3]**

**Question:** Research and compare SDLC models suitable for engineering projects. Present findings on Waterfall, Agile, Spiral, and V-Model approaches, emphasizing their advantages, disadvantages, and applicability in different engineering contexts.

**Solution:**

1. **Waterfall Model:**

**Description:**

* The waterfall methodology is a project management approach that emphasizes a linear progression from beginning to end of a project.
* It is one of the oldest and most traditional methodologies, characterized by a series of distinct phases that must be completed before moving on to the next.

**Advantages**:

* Simple and Easy to Understand.
* Structured Approach.
* Good for Smaller Projects.
* Early Design.

**Disadvantages:**

* Inflexibility.
* Late Testing.
* Risk of Requirement Misunderstanding.
* Limited Customer Involvement.
* Sequential Delivery.

**Applicability:** Suitable for projects with well-defined requirements.

**2. Agile Model:**

**Description:**

* Agile is a set of principles and practices for software development that emphasize flexibility, collaboration, and customer satisfaction.
* Unlike traditional models such as the Waterfall or V-Model, Agile focuses on iterative development, where requirements and solutions evolve through the collaborative effort of cross-functional teams.

**Advantages:**

* Flexibility and Adaptability.
* Customer Satisfaction.
* Faster Time to Market.
* Improved Quality.
* Enhanced Team Collaboration.

**Disadvantages:**

* Scope Creep.
* Requires Skilled Teams.
* Less Predictable.
* Initial Resistance.

**Applicability:** Ideal for projects with evolving requirements.

**3. Spiral Model:**

**Description:**

* The spiral model is a systems development lifecycle (SDLC) method used for risk management that combines the iterative development process model with elements of the Waterfall model.
* The spiral model is used by software engineers and is favored for large, expensive and complicated projects.

**Advantages:**

* Risk handling.
* Good for large project.
* Flexibility in Requirements.
* Customer Satisfaction.
* Iterative and Incremental Approach.

**Disadvantages:**

* Complexity.
* Potentially high costs.
* Time-Consuming.
* Too much dependability on Risk Analysis.

**Applicability:** Suitable for large, high-risk projects.

**4. V-Model:**

**Description**:

* The V model, also known as the V-Model, is a software development process model that emphasizes verification and validation.
* It is an extension of the waterfall model and maps the types of testing to each stage of development in a V-shaped diagram.
* The left side of the "V" represents the decomposition of requirements and creation of system specifications, while the right side represents the integration and testing of the system.

**Advantages:**

* This is a highly disciplined model and Phases are completed one at a time.
* V-Model is used for small projects where project requirements are clear.
* Simplicity and Ease of Use.

**Disadvantages:**

* High risk and uncertainty.
* It is not good for complex and object-oriented projects.
* It is not suitable for projects where requirements are not clear and contain a high risk of changing.
* This model does not support iteration of phases.

**Applicability:** Suitable for projects where testing is critical.