**VM350 Mini-project 2 Rubric**

1. **Design Synthesis and Justification (18 points)**
2. Design Concept & Sketch (10 pts)

* **Mechanism Sketch (5 pts):** A clear, neat sketch that accurately depicts the final gripper design.
* **Labeling (3 pts):** All key components (links, joints, energy-storing element) and materials are clearly labeled.
* **Dimensional Rationale (2 pts):** A brief justification for the key dimensions related to grasping the 10cm cylinder.

1. Explanation of Principle (8 pts)

* **Bistability Principle (8 pts):** A thorough and correct explanation of how the design achieves bistability (e.g., via compliant element or geometric linkage). The description clearly identifies the components responsible for storing and releasing energy to create the “snap” action.

1. **Mechanism Analysis (16 points)**
2. Kinematic Analysis (8 pts)

* **Kinematic Diagram (3 pts):** A correct and simplified kinematic diagram of the core mechanism.
* **Links & Joints (3 pts):** Correctly identifies the number of links (L) and joints (J, specified as revolute or sliding).
* **Mobility (2 pts):** Correctly calculates the mobility (degrees of freedom) and briefly discusses if it matches the observed motion.

1. Energy State Analysis (8 pts)

* **Stable State 1 (Open) (2 pts):** A clear description of the gripper’s open configuration.
* **Unstable Transition State (3 pts):** A clear description of the “tipping point” and the action required to reach it.
* **Stable State 2 (Locked) (3 pts):** A clear description of the closed configuration and how it passively locks.

1. **Prototyping & Discussion (16 points)**
2. Identification of Technical Problems (8 pts)

* **First Problem (4 pts):** A clear and detailed description of a significant technical problem encountered.
* **Second Problem (4 pts):** A clear and detailed description of a second significant technical problem.

1. Proposed Corrections (8 pts)

* **First Correction (4 pts):** A logical and well-explained design modification proposed to solve the first problem.
* **Second Correction (4 pts):** A logical and well-explained design modification proposed to solve the second problem.

1. **Prototype Functionality & Demonstration (10 points)**
2. Bistability Demonstration (6 pts)

* **“Snap” Action (3 pts):** The prototype demonstrates a clear, distinct snap-through action between its two states.
* **Stability (3 pts):** The prototype holds both its open and closed states without continuous force.

1. Grasping Performance (4 pts)

* **Successful Grasp (2 pts):** The gripper successfully closes on and captures the 10cm cylinder.
* **Locking Strength (2 pts):** The passive grip provides noticeable resistance when the cylinder is pulled.

**Team Member Contributions (Required for Submission)**

A clear and specific list of contributions for each team member is included. (This is a completion requirement, not graded for points).

**BONUS: Servo Actuation (Maximum 10 Bonus Points)**

1. **Trigger Mechanism Design (5 pts)**

* A clear sketch and detailed description of the servo integration and trigger mechanism.

1. **Actuated Performance & Verification (5 pts)**

* The servo reliably triggers the bistable snap, and the “power-off hold” is successfully demonstrated.

**Total Points: 60 + 10 Bonus**