**TASK 3:**

**ABOUT A MECHATRONIC SYSTEM:**

**Anti-lock Braking System (ABS)** prevents the wheels from locking up during braking, especially on slippery surfaces, allowing the driver to maintain steering control. Here’s a step-by-step breakdown of its operation:

**Main Components**

**Speed Sensors**: Located on each wheel, these sensors monitor the speed of each wheel and send data to the ABS controller.

**ABS Controller**: The electronic control unit (ECU) that processes data from the speed sensors and controls the braking force applied to each wheel.

**Valves**: Situated in the brake lines, these valves control the pressure to each brake.

There are typically three positions:

Open to allow full pressure from the master cylinder.

Closed to isolate the brake from the master cylinder and prevent further pressure increase.

Release pressure from the brake.

**Pump**: Used to restore the pressure to the brakes after the valves have reduced it.

**Example Scenario**

Imagine you're driving on a wet road and a pedestrian suddenly steps into your path. You slam on the brakes. Without ABS, the wheels might lock up, causing you to skid uncontrollably.

**With ABS:**

The speed sensors detect that one or more wheels are decelerating too quickly.

The ABS controller adjusts the brake pressure to those wheels, reducing the risk of a skid.

This modulation allows you to maintain steering control, so you can swerve around the pedestrian if necessary, while still bringing the car to a stop.

In this scenario, ABS helps you avoid a potential accident by providing better control during emergency braking on a slippery surface.