ECU FUNCTIONAL TESTING

An **ECU (Electronic Control Unit)** is an embedded system used in vehicles to control and manage engine operations such as fuel injection, ignition timing, and sensor-based decision making. The ECU continuously receives input from various sensors and processes this data to control the engine efficiently and safely.

The flowchart helps testers systematically check ECU behavior by following a defined sequence. If the ECU output matches the expected behavior, the test passes. If any deviation occurs, it is identified, logged, corrected, and re-tested. This ensures that the ECU performs all its intended functions correctly before vehicle deployment.

FLOWCHART

START: ECU Functional Testing

1. Requirements & Design Review
Study ECU specs, fuel flow, control logic, sensor requirements

2. Test Planning
Define normal/boundary/fault scenarios

3. Test Design
• Sensor inputs
• Engine control
• Fuel injection
• Ignition timing

4. Test Environment Setup
Configure sensors/actuators

5. Test EXECUTION:
Following Operational Sequence

1. Verify SENSOR INPUTS
Read temp, speed, throttle sensors

2. Verify ENGINE CONTROL
Decide operation based on sensor data

3. Verify FUEL INJECTION
Control fuel amount & timing

4. Verify IGNITION TIMING
Trigger spark for combustion

All Tests PASS?

Log defects, retest

6. Test Reporting
ECU APPROVED

END