**WEEK – 04 Demonstration of soil moisture sensor for agriculture application.**

**PRELAB QUESTIONS - 04**

1. How to measure accuracy of soil moisture sensor?

Ans:

To measure the accuracy of a soil moisture sensor, compare its readings against a known moisture content standard or reference method, such as oven-drying soil samples to obtain absolute moisture content. Perform multiple readings across different soil types and moisture levels to assess consistency and precision.

1. What is the difference between volumetric water content (VWC) and gravimetric water content (GWC)?

Ans:

Volumetric Water Content (VWC) measures the volume of water per volume of soil, indicating how much water is held in soil as a percentage of total volume. Gravimetric Water Content (GWC) measures the mass of water per mass of dry soil, expressing moisture content as a weight percentage. VWC is more directly related to the soil's ability to hold and transmit water to plants, whereas GWC is simpler to measure directly but requires additional data to convert to VWC for most applications.

1. After installing the sensor probes, there is some variability between readings, even though they are all buried at the same depth. Why?

Ans:

Variability in sensor readings, even at the same depth, can result from soil heterogeneity, differences in soil compaction, moisture gradients, root interference, or sensor calibration issues. It reflects the natural variability in soil properties and moisture distribution within a given area.

1. Difference between EC-5 and ECH2O sensors.

Ans:

*Technology and Range*: Both use capacitance for moisture measurement, but may differ in sensitivity and measurement range, with EC-5 designed for broad accuracy in mineral soils.

*Specific Applications*: EC-5 is suited for general soil moisture measurements, while ECH2O models may offer additional functionalities like temperature and electrical conductivity measurements for diverse research needs.

Lab programs:

1. Write a program to control soil moisture sensor.

Code:

import time

import Adafruit\_GPIO.SPI as SPI

import Adafruit\_MCP3008

SPI\_PORT = 0

SPI\_DEVICE = 0

mcp = Adafruit\_MCP3008.MCP3008(spi=SPI.SpiDev(SPI\_PORT, SPI\_DEVICE))

while True:

t = mcp.read\_adc(0)

p = (100 - (t / 1023.0) \* 100)

print('Moisture content is:', p)

time.sleep(3)

OUTPUT:

 