

Answer on Question #60323-Physics-Other

In a calibration test, 10 measurements using a digital voltmeter have been made of the voltage of a battery that is known to have a voltage of 6.11 V. The readings are: 5.98, 6.05, 6.10, 6.06, 5.99, 5.96, 6.02, 6.09, 6.03, and 5.99 V.

- i) Explain how you would use the calibration test data to correct this digital voltmeter.
- ii) State at least a merit and a demerit of the correction method you have discussed in part i).

Solution

i) The average of the readings is

$$\frac{5.98 + 6.05 + 6.10 + 6.06 + 5.99 + 5.96 + 6.02 + 6.09 + 6.03 + 5.99}{10} = 6.03$$

If we add 0.08 V to all reading taken then it would average to 6.11V

ii) Now as we have not calibrated it at any other read value this would only be reasonable for values close to 6V.

Even there as our reading varied by 0.1 from lowest to highest, if we took a single reading we could only be reasonably confident that the reading was within +/- 0.05 V of the actual value that existed in the circuit under test.