

LATEEF Abdulateef Aderemi

PHYSICS Assignment

① A resistor of resistance R is connected across a cell. If the terminal p.d of the cell is reduced to one-quarter of its emf. express the internal resistance r of the cell in terms of R .

Solution

$$V = \frac{3 \text{ e.m.f.}}{4}$$

$$4V = 3 \text{ e.m.f.}$$

$$\text{Emf} = \frac{4V}{3}$$

$$\frac{V}{R} = \frac{\text{E.m.f.}}{R+r}$$

$$\frac{V}{R} = \frac{\frac{4V}{3}}{\frac{3}{R+r}}$$

$$\frac{V}{R} = \frac{4V}{3(R+r)}$$

$$4VR = 3V(R+r)$$

$$\frac{4R}{3} = R + r$$

$$\frac{4R - 3R}{3} = r$$

$$r = \frac{R}{3}$$

Q A work of 30 joules is done in bringing 5 mill-
Coulombs of charge from a point B to a point A in electric
field. What is the potential difference between B and A?

Solution

$$V = \frac{W}{Q}$$

$$W = 30 \text{ joules}$$

Q is the charge in coulombs. Convert milli-coulombs to coulombs

$$Q = 5 \text{ mC} = 5 \times 10^{-3} \text{ C}$$

$$W = 30 \text{ J}$$

$$\therefore V = \frac{30 \text{ J}}{5 \times 10^{-3} \text{ C}}$$

$$V = \frac{30}{0.005}$$

$$V = 6000 \text{ V}$$

$$V = 6.0 \times 10^3 \text{ V}$$