Answer on Question #54447-Physics-Electric Circuits

n identical cells, each of emf e and internal resistance r, are joined in series to form a closed circuit. One cell A is joined with reversed polarity.

a. The potential difference across each cell except A is?

b. The potential difference across A is?

Solution

a.

$$I = \frac{ne - 2e}{Nr} = \frac{(n-2)e}{nr}$$

$$V = e - Ir = e - \frac{(n-2)e}{nr}r = e\left(1 - \frac{n-2}{n}\right) = \frac{2e}{n}.$$

b.

$$V = -e - Ir = -e - \frac{(n-2)e}{nr}r = -e\left(1 + \frac{n-2}{n}\right) = -\frac{2(n-1)e}{n}.$$