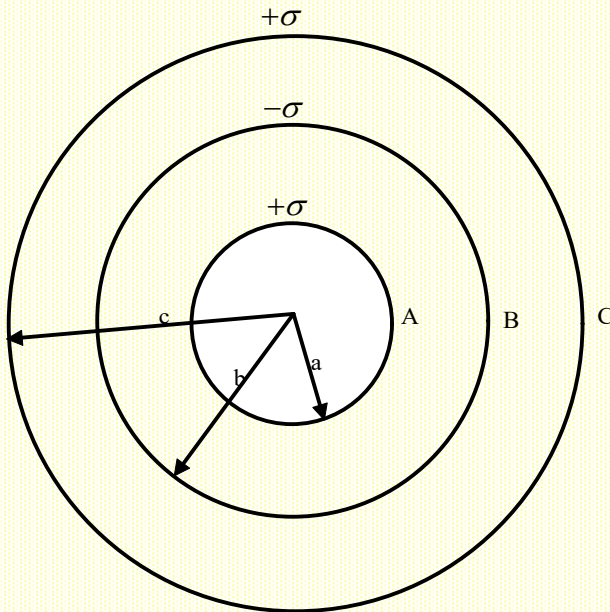


Three concentric metal shells A, B and C of respective radii a , b and c ($a < b < c$) have surface charge densities $+\sigma$, $-\sigma$ and $+\sigma$ respectively. The potential of shell B is:

- (1) $\frac{\sigma}{\epsilon_0} \left(\frac{a^2 - b^2}{a} + c \right)$ (2) $\frac{\sigma}{\epsilon_0} \left(\frac{a^2 - b^2}{b} + c \right)$
 (3) $\frac{\sigma}{\epsilon_0} \left(\frac{b^2 - c^2}{b} + a \right)$ (4) $\frac{\sigma}{\epsilon_0} \left(\frac{b^2 - c^2}{c} + a \right)$

Solution



$$V_{B_{Net}} = V_A + V_B + V_C$$

$$V_{B_{Net}} = \frac{1}{4\pi\epsilon_0} \left(\frac{q_A}{b} + \frac{q_B}{b} + \frac{q_C}{c} \right)$$

$$V_{B_{Net}} = \frac{1}{4\pi_0} \left(\frac{\sigma 4\pi a^2}{b} - \frac{\sigma 4\pi b^2}{b} + \frac{\sigma 4\pi c^2}{c} \right) = \frac{\sigma}{0} \left(\frac{a^2}{b} - b + c \right)$$

$$\therefore V_{B_{Net}} = \frac{\sigma}{\epsilon_0} \left(\frac{a^2 - b^2}{b} + c \right)$$

Hence, Option (2). [Based on JEE Main 2018 - [123IITJEE](#)]