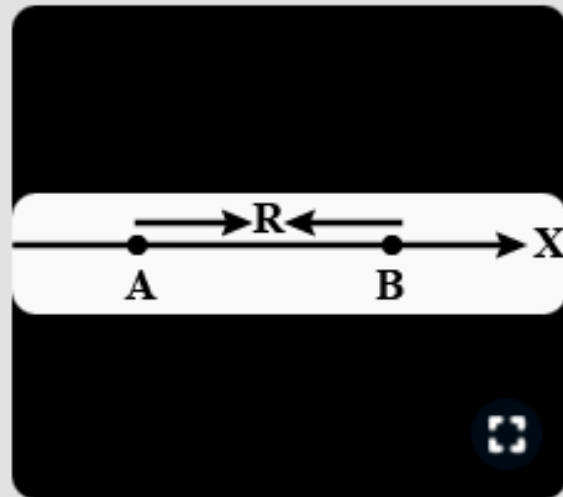Two electric dipoles, A, B with respective dipole moments $\vec{d}_A = -4qa\hat{i}$ and $\vec{d}_B = -2qa\hat{i}$ placed on the x-axis with a separation R, as shown in the figure.

The distance from A at which both of them produce the same potential is

A $\dfrac{\sqrt{2}R}{\sqrt{2}+1}$

B $\dfrac{R}{\sqrt{2}+1}$

C $\dfrac{\sqrt{2}R}{\sqrt{2}-1}$

D $\dfrac{R}{\sqrt{2}-1}$

Correct option is C)

$$V = \frac{4qa}{(R+x)} = \frac{2qa}{(x^2)}$$

$$\sqrt{2}x = R + x$$

$$x = \frac{R}{\sqrt{2}-1}$$

$$\text{distance} = \frac{R}{\sqrt{2}-1} + R = \frac{\sqrt{2}R}{\sqrt{2}-1}.$$