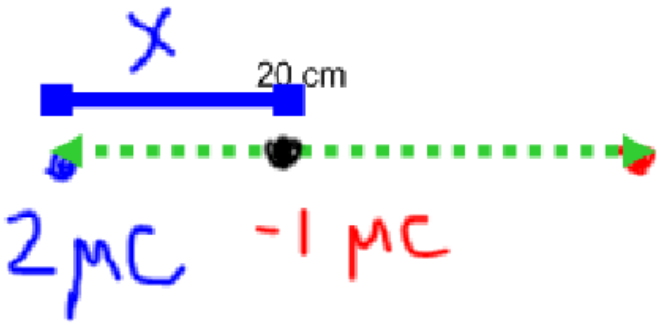
Answer on Question #51118 - Physics, Electric Circuits

Question:

Two electric charges 2 μC and –1 μC are placed at a distance of 20 cm from each other in vacuum. Locate the point on the line joining these two charges outside the region between them at which the electric potential is zero with reference to the positive charge.

Answer:



The potential of first charge is

$$\varphi_1 = k\frac{q_1}{x}$$

The potential of second charge is

$$\varphi_2 = k\frac{q_2}{x-20}$$

Sum potential is zero

$$\varphi_1 + \varphi_2 = 0$$

$$\frac{q_1}{x} + \frac{q_2}{x-20} = 0$$

$$\frac{q_1}{x} = \frac{q_2}{20-x}$$

$$x = \frac{20 \cdot q_1}{q_1 + q_2} = \frac{20\ cm \cdot 2\ \mu C}{2\ \mu C - 1\ \mu C} = 40\ cm$$

$$x = 40\ cm$$