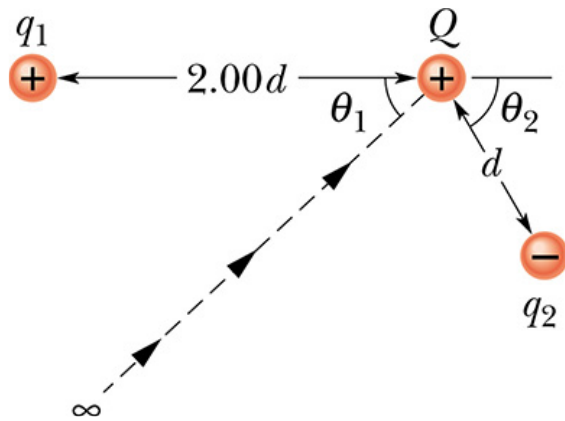**Answer on Question #65280-Physics-Other**

In the figure below, how much work is required to bring the charge Q = +16e and initially at rest, along the dashed line from infinity to the indicated point near two fixed particles of charges q1 = +4e and q2 = −q1/2?

Distance d = 1.40 cm, θ1 = 41°, and θ2 = 58°.

Solution

$$V(\infty) = 0$$

The potential from point charge q is

$$V = \frac{kq}{r}$$

The initial potential:

$$V_{in} = V(\infty) = 0$$

The final potential:

$$V_{fin} = k\left(\frac{q_1}{2d} + \frac{q_2}{d}\right) = k\left(\frac{q_1}{2d} - \frac{q_1}{2d}\right) = 0.$$

The potential difference is

$$V_{fin} - V_{in} = 0 - 0 = 0.$$

The total work is

$$W = Q\left(V_{fin} - V_{in}\right) = 0$$

Answer: 0 J.