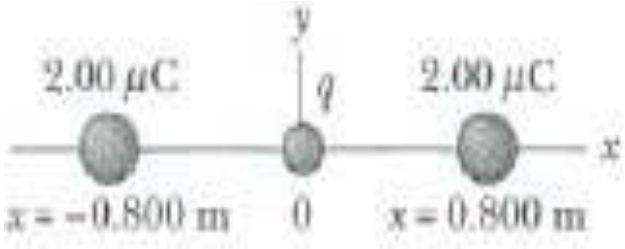
Q- Given two *2.00-μC* charges, as shown in Figure and a positive test charge $q = 1.28 * 10^{-18}$ C at the origin,

(a) What is the net force exerted by the two *2.00-μC* charges on the test charge *q?*

As the two charges are equal in magnitude and at equal distance from the origin or test charge q, the magnitude of the force on q due to both are equal. As the two charges are on opposite sides of the test charge, the forces are in opposite direction. Hence the resultant of these two equal and opposite forces on q will be zero.



So the net force exerted by the two charges on q will be zero.

(b) What is the electric field at the origin due to the two *2.00μC* charges?

The two charges are equal in magnitude, like charges and at equal distances on opposite sides, the electric fields due to both are equal and opposite and their resultant will be zero.

Hence the resultant field at origin due to the two charges is zero.

(c) What is the electric potential at the origin due to the two *2.00-μC* charges?

The potential is a scalar quantity and due to a point charge q at a distance r from it is given by

$$V = \frac{q}{4\pi \in_0 r}$$

Hence potential at the origine due to one charge of 2.00 μC will be

$$V = \frac{q}{4\pi \in_0 r} = 9*10^9 * \frac{2.00*10^{-6}}{0.800} = 22500\,\text{V}$$

Hence potential due to both charges will be

2*V = 2* 22500 = **45000 V**