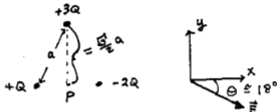


Name: Answers Key

Discussion Instructor: Battelino Bruno DeSisto Gehrke Izatt
 Roshko Sawyer Shastri

PROBLEM 3



Three charges are placed at the corners of an equilateral triangle of side a as shown. At point P , the midpoint of the base find (a) the electric field (magnitude and direction) and (b) the electric potential. [Use the coordinate axes shown to simplify grading. Take the origin at P]

$$a) \vec{E} = \left[\frac{kQ}{\left(\frac{a}{2}\right)^2} + \frac{2kQ}{\left(\frac{a}{2}\right)^2} \right] \hat{y} - \left[\frac{3kQ}{4a^2} \right] \hat{x} = \text{the electric field}$$

$$\vec{E} = \frac{12kQ}{a^2} \hat{y} - \frac{4kQ}{a^2} \hat{x}$$

$$b) V = \frac{kQ}{\left(\frac{a}{2}\right)} + \frac{(-2kQ)}{\left(\frac{a}{2}\right)} + \frac{3kQ}{\left(\frac{\sqrt{3}}{2}a\right)} = \sum \frac{kQ}{r}$$

$$= -\frac{2kQ}{a} + \frac{2\sqrt{3}kQ}{a}$$

$$V = \frac{2kQ}{a}(\sqrt{3} - 1)$$