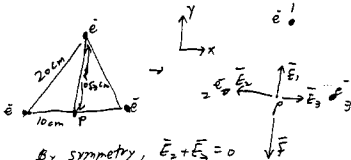


Average score: 17.4PHYSICS 172
FINAL EXAM
MARCH 12, 1979NAME _____
RECITATION INSTRUCTOR (CIRCLE) Hamm Stone DeSouza
Baird Conwell Nelson

1. An electron is placed at each corner of an equilateral triangle having sides of length 20 cm.
- (a) What is the electric field at the midpoint of one of the sides?
- (b) What force would another electron placed there experience?



a.) By symmetry, $\vec{E}_2 + \vec{E}_3 = 0$

$$\therefore \vec{E} = \vec{E}_1 = \hat{y} \frac{(1.6 \times 10^{-19} \text{ coul.})(9 \times 10^9) \frac{\text{Coul}^2}{\text{N} \cdot \text{m}^2}}{(0.1)(5/3) \text{ m}} = \hat{y} \frac{4.8 \times 10^{-8} \text{ volts}}{\text{m}}$$

direction: up
(using the pictures above)

$$b.) \vec{F} = -e\vec{E} = -(1.6 \times 10^{-19} \text{ coul.})(4.8 \times 10^{-8} \frac{\text{V}}{\text{m}}) \hat{y} = -7.68 \times 10^{-27} \text{ nt. } \hat{y}$$

$$= -7.7 \times 10^{-27} \text{ nt. } \hat{y}$$

→ in direction away from the triangle,
down using the diagrams above.