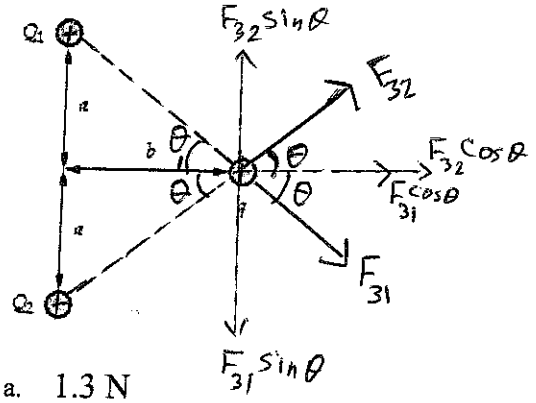
Name: Key Class: _____ Date: _____ ID: B

PHYS132-QUIZ1

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ 1. If $a = 3.0$ mm, $b = 4.0$ mm, $Q_1 = 60$ nC, $Q_2 = 80$ nC, and $q = 32$ nC in the figure, what is the magnitude of the total electric force on q?



$\cos\theta = \frac{4}{5} = 0.8$

$\sin\theta = \frac{3}{5} = 0.6$

a. 1.3 N
b. 1.6 N
c. 1.9 N
d. 2.2 N
e. 0.040 N

$$F_{31} = \frac{9\times10^{9}\times60\times10^{-9}\times32\times10^{-9}}{(5\times10^{-3})^2} = 0.69\ N$$

$$F_{32} = \frac{9\times10^{9}\times80\times10^{-9}\times32\times10^{-9}}{(5\times10^{-3})^2} = 0.92\ N$$

$$\vec{F}_3 = \vec{F}_{31} + \vec{F}_{32}$$

$$(F_3)_x = F_{31}\cos\theta + F_{32}\cos\theta$$

$$= (F_{31} + F_{32})\cos\theta$$

$$= 1.29\ N$$

$$(F_3)_y = F_{32}\sin\theta - F_{31}\sin\theta$$

$$= (F_{32} - F_{31})\sin\theta$$

$$= 0.14\ N$$

$$F_3 = \sqrt{F_{3x}^2 + F_{3y}^2}$$

$$= 1.29\ N = 1.3\ N$$