Physics 112
Quiz #4
September 3, 1999

Name: _____

$e = 1.60 \times 10^{-19}$ C
mass of proton $= 1.7 \times 10^{-27}$ kg
$G = 6.7 \times 10^{-11}$ N m^2/kg^2
$k = 9 \times 10^{9}$ N m^2/C^2

1. A 5C charge is located at the origin. A second charge is placed 7m away from the 5C charge. Given the following choices, the magnitude of the electrical force exerted on the 5C charge is greatest if the second charge is:
   A) 0C
   B) 1C
   C) 5C
   D) 10C
   E) –7C
   F) –15C
   G) It doesn't matter what the second charge is.

2. A proton is located at (–1 m, 0 m) and two protons are located at (+1 m, 0 m). A 1-C charge is located at the origin. What is the magnitude of the ***net electrical force*** experienced by the charge at the origin?
   A. 0 N
   B. 0.36×10^{-9} N
   C. 0.72×10^{-9} N
   D. 1.08×10^{-9} N
   E. 1.44×10^{-9} N
   F. 2.88×10^{-9} N
   G. 4.32×10^{-9} N

3. Two positive point charges Q and 3Q are separated by a distance R. [No other charges are present, and there is no external electric field.] If the charge Q experiences a force of magnitude 12 N when the separation is R, what is the magnitude of the force *on the charge 3Q* when the separation is 2R?
   A. 1 N
   B. 2 N
   C. 3 N
   D. 4 N
   E. 6 N
   F. 8 N
   G. 9 N
   H. 12 N
   I. 18 N
   J. 24 N

4. A proton is located 20 centimeters from an electron. What is the magnitude of the electrical force that the electron exerts on the proton? *No partial credit. Your answer must be within 10% of the correct answer to receive credit. Units missing or incorrect: –1 point.*

Answer: _____