Name Answer Key Date _____

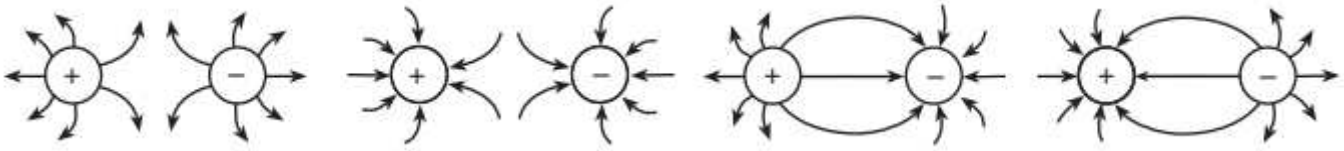
Honors Physics Electrostatics WS #7H

Period _____ Mrs. Nadworny

Electric Fields

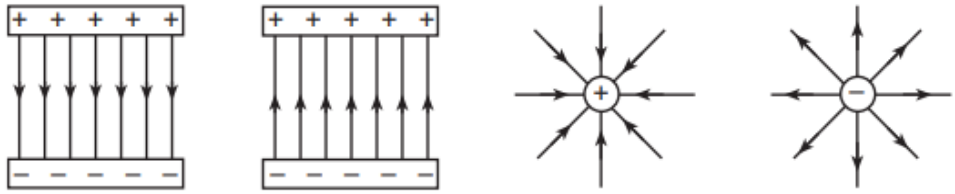
Directions: Solve the following problems using the GUESS method and proper significant figures. Be sure to show ALL work.

1. Which diagram represents the electric field between two oppositely charged conducting spheres?



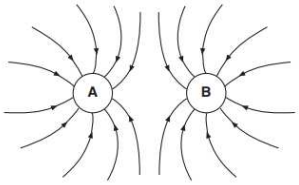
(A) (B) (C) (D)

2. Which diagram correctly represents an electric field?



(A) (B) (C) (D)

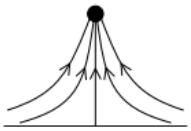
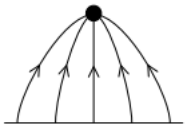
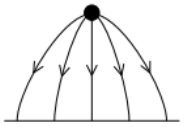
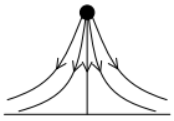
3. The diagram below represents the electric field in the region of two small charged spheres.



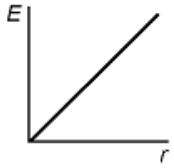
What is the sign of the net charge on A and B?

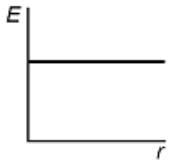
(A) A is positive and B is positive.
(B) A is positive and B is negative
(C) A is negative and B is positive.
(D) A is negative and B is negative.

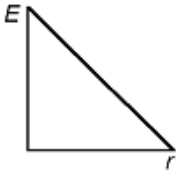
4. A positive point charge is placed above a metal plate at zero electric potential. Which diagram shows the pattern of electric field lines between the charge and the plate?

(A)  (B)  (C)  (D) 

5. Which graph best represents the relationship between the magnitude of the electric field strength, E, around a point charge and the distance, r, from the point charge?

(A) 

(B) 

(C) 

(D) 

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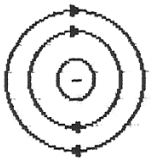
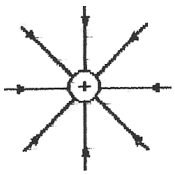
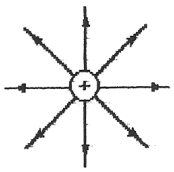
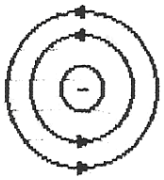
6. Which diagram best represents the electric field of a point charge?

(A)  (B)  (C)  (D) 

7. A positive charge of 1.50 x 10^{-5} C experiences a force of 0.26 N when located at a certain point in an electric field from a positive charge. What is the electric field strength at that point?

$$E = \frac{F}{q} = \frac{0.26N}{1.5\times10^{-5}C} = 1.7\times10^{4}\ \tfrac{N}{C}\ \text{away}$$

8. The electric field intensity at a point is 4.0 x 10^{5} N/C. What is the magnitude of the force that a 5.5 x 10^{-6} C charge experiences at that point?

$$F = Eq = (4.0\times10^{5}\ \tfrac{N}{C})(5.5\times10^{-6}C) = 2.2N$$

9. What charge does a test charge have when a force of 7.90 x 10^{-6} N acts on it at a point where the electric field intensity is 1.45 x 10^{-5} N/C?

$$q = \frac{F}{E} = \frac{7.90\times10^{-6}N}{1.45\times10^{-5}C} = +0.545C$$

10. What is the strength of the electric field at a distance of 4.8 x 10^{-12} meter away from an electron?

$$E = \frac{kq}{r^2} = \frac{\left(8.99x10^{9}\ \tfrac{N\cdot m^2}{C^2}\right)\left(-1.60x10^{-19}C\right)}{(4.8x10^{-12}m)^2} = 6.2x10^{13}\ \tfrac{N}{C}\ \text{toward}$$

11. How much force would be exerted on a proton placed at the position mentioned in the previous question?

$$F = Eq = (6.2x10^{13}\ \tfrac{N}{C})(1.60x10^{-19}C) = 9.9x10^{-6}N\ \text{toward}$$

Answers in size order: 9.9 x 10^{-6}, 0.545, 2.2, 1.7 x 10^{4}, 6.2 x 10^{13}