CHAPTER 7 FREESTANDING PRACTICE QUESTIONS

1. How far apart are two charges ($A = 10\ \mu C$ and $B = 12\ \mu C$) if the electric potential measured at point C midway between them is 10 V?

A) 2×10^{-5} m
B) 2×10^{5} m
C) 4×10^{-4} m
D) 4×10^{4} m

2. Two charges ($+q$ and $-q$) each with mass 9.11×10^{-31} kg are placed 0.5 m apart and the gravitational force (F_G) and electric force (F_E) are measured. If the ratio of F_G/F_E is -1.12×10^{-77}, what is the new ratio if the distance between the charges is halved?

A) -2.24×10^{-77}
B) -1.12×10^{-77}
C) -5.6×10^{-78}
D) -2.8×10^{-78}

3. Two equally positive charges are r distance apart. If the amount of charge on A is doubled and the distance between the charges is doubled, what is the ratio of new electric force to old electric force?

A) 1/4
B) 1/2
C) 2
D) 4

4. The amount of work required to move a charge in an electric field depends:

A) only on the change in potential and not the path traveled.
B) on both the change in potential and the path traveled.
C) only on the path traveled and not the change in potential.
D) on neither the path traveled nor the change in potential.

5. Which of the following pairs of electric forces form an action-reaction pair?

I. Two positive charges, of different masses, placed at a distance d apart.
II. Two negative charges, of equal masses, placed at a distance d apart.
III. One positive charge and one negative charge, of equal masses, placed at a distance d apart.

A) I and II only
B) II and III only
C) III only
D) I, II and III

6. A hollow metal sphere of radius 0.5 m has a net charge of 2.0×10^{-6} C. A solid metal sphere of radius 0.5 m has a net charge of 4.0×10^{-6} C. The centers of the spheres are placed a distance 2 m apart. Compared to the electric field at the center of the hollow sphere, the electric field at the center of the solid sphere is:

A) twice the magnitude.
B) four times the magnitude.
C) half the magnitude.
D) equal in magnitude.

7. Starting from rest, a sphere of mass 2 kg and charge –0.1 C slides across a frictionless horizontal plane through a potential difference of 220 V. Determine the instantaneous velocity of the sphere the moment it has rolled through this potential.

A) 4.7 m/s
B) 5.1 m/s
C) 5.5 m/s
D) 6.1 m/s