**Practice - Electric Potential**

**Name:** _____ **Date:** _____

1. An electrical potential of one joule per coulomb is equal to

   A. one coulomb B. one ampere

   C. one ohm D. one volt

2. A unit of electrical energy is the

   A. ampere B. volt

   C. watt D. joule

3. The work required to move a charge of 3.0 coulombs through a potential difference of 12 volts is

   A. 0.25 joule B. 9 joules

   C. 36 joules D. 4.0 joules

4. If 20.0 joules of work is needed to move 5.0 coulombs of electrical charge through a circuit, the voltage is

   A. 100 volts B. 25 volts

   C. 0.25 volt D. 4.0 volts

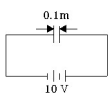
5. If 8.0 joules of work is required to transfer 4.0 coulombs of charge between two points, then the potential difference between the two points is

   A. 6.4 V B. 2.0 V C. 32 V D. 40 V

6. The diagram shows two parallel metal plates, 0.1 meter apart, with a potential difference between them of 10 volts. What is the electric field intensity between the plates?

   A. 1 N/C B. 100 N/C

   C. 0.001 N/C D. 0 N/C




7. A proton moves through a potential difference of 1,000 volts. The change in the proton's potential energy will be

   A. 1,000 eV B. 2,000 eV

   C. 3,000 eV D. 4,000 eV

8. Moving a point charge of $3.2 \times 10^{-19}$ coulomb between points $A$ and $B$ in an electric field requires $4.8 \times 10^{-19}$ joule of energy. What is the potential difference between these two points?

   A. 0.67 V B. 2.0 V

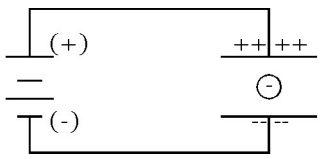
   C. 3.0 V D. 1.5 V

9. A helium ion with $+2$ elementary charges is accelerated by a potential difference of $5.0 \times 10^3$ volts. What is the kinetic energy acquired by the ion?

   A. $3.2 \times 10^{-19}$ eV B. 2.0 eV

   C. $5.0 \times 10^3$ eV D. $1.0 \times 10^4$ eV

10. The diagram represents a negatively charged oil drop between two oppositely charged parallel plates. The forces acting on the oil drop are in equilibrium. The oil drop could have a charge of




   A. $6.4 \times 10^{-19}$ C B. $2.0 \times 10^{-19}$ C

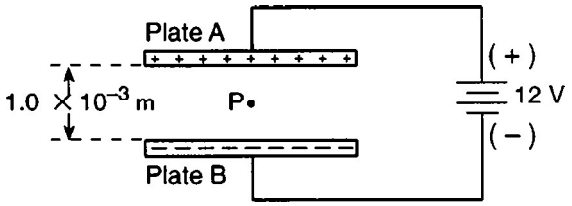
   C. $1.6 \times 10^{-38}$ C D. $3.2 \times 10^{-50}$ C

11. Moving 2.0 coulombs of charge a distance of 6.0 meters from point $A$ to point $B$ within an electric field requires a 5.0-newton force. What is the electric potential difference between points $A$ and $B$?

   A. 60. V B. 30. V C. 15 V D. 2.5 V

12. Base your answer(s) to the following question(s) on the information and diagram below.

Two parallel plates separated by a distance of $1.0 \times 10^{-3}$ meter are charged to a potential difference of 12 volts. An alpha particle with a charge of +2 elementary charges is located at point *P* in the region between the plates.




The electric field between the plates will cause the alpha particle, starting from rest at point *P*, to

A. accelerate toward the positive plate

B. accelerate toward the negative plate

C. move at constant speed toward the positive plate

D. move at constant speed toward the negative plate

13. An electron is located between a pair of oppositely charged parallel plates. As the electron approaches the positive plate, the kinetic energy of the electron

A. decreases B. increases

C. remains the same

14. The potential difference between a pair of charged parallel plates 0.050 meter apart is 50 volts. What is the electric field intensity between the plates?

A. $1.0 \times 10^2$ N/C B. $2.5 \times 10^2$ N/C

C. $5.0 \times 10^2$ N/C D. $1.0 \times 10^3$ N/C

15. A distance of $1.0 \times 10^3$ meters separates the charge at the bottom of a cloud and the ground. The electric field intensity between the bottom of the cloud and the ground is $2.0 \times 10^4$ newtons per coulomb. What is the potential difference between the bottom of the cloud and the ground?

A. $1.3 \times 10^{23}$ V B. $2.0 \times 10^1$ V

C. $2.0 \times 10^7$ V D. $5.0 \times 10^{-2}$ V

16. Two oppositely charged parallel plates are a fixed distance apart. Which graph best represents the relationship between the electric field intensity (E) between the plates and the potential difference (V) across the plates?

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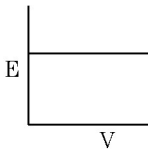


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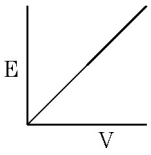


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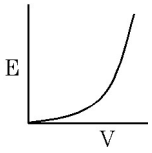


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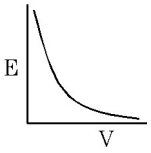


17. If the potential difference between two oppositely charged parallel metal plates is doubled, the electric field intensity at a point between them is

A. halved B. unchanged

C. doubled D. quadrupled

18. Base your answer(s) to the following question(s) on the information below.

A proton starts from rest and gains $8.35 \times 10^{-14}$ joule of kinetic energy as it accelerates between points *A* and *B* in an electric field.

Calculate the potential difference between points *A* and *B* in the electric field. [Show all work, including the equation and substitution with units.]