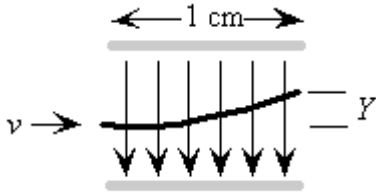


AP physics B - Web Review ch 16 Electric Fields and Capacitance**Please do not write on my tests****Multiple Choice***Identify the choice that best completes the statement or answers the question.*

- _____ 1. A proton ($+1.6 \times 10^{-19}$ C) moves 10 cm on a path in the direction of a uniform electric field of strength 3.0 N/C. How much work is done on the proton by the electrical field?
- 4.8×10^{-20} J
 - -4.8×10^{-20} J
 - 1.6×10^{-20} J
 - -1.6×10^{-20} J
 - zero
- _____ 2. A proton ($+1.6 \times 10^{-19}$ C) moves 10 cm along the direction of an electric field of strength 3.0 N/C. The electrical potential difference between the proton's initial and ending points is:
- 4.8×10^{-19} V
 - 0.30 V
 - 0.033 V
 - 30 V
 - 330 V
- _____ 3. A free electron is in an electric field. With respect to the field, it experiences a force acting:
- parallel.
 - anti-parallel (opposite in direction).
 - perpendicular.
 - along a constant potential line.
 - none of the above is correct in the general case.
- _____ 4. A uniform electric field, with a magnitude of 600 N/C, is directed parallel to the positive x -axis. If the potential at $x = 3.0$ m is 1 000 V, what is the change in potential energy of a proton as it moves from $x = 3.0$ m to $x = 1.0$ m? ($q_p = 1.6 \times 10^{-19}$ C)
- 8.0×10^{-17} J
 - 1.9×10^{-16} J
 - 0.80×10^{-21} J
 - 500 J
 - 2.2×10^{-15} J
- _____ 5. An electron in a cathode ray tube is accelerated through a potential difference of 5.0 kV. What kinetic energy does the electron gain in the process? ($e = 1.6 \times 10^{-19}$ C)
- 1.6×10^{-16} J
 - 8.0×10^{-16} J
 - 1.6×10^{-22} J
 - 8.0×10^{22} J
 - 1.6×10^{16} J

- _____ 6. An electron with velocity $v = 1.0 \times 10^6$ m/s is sent between the plates of a capacitor where the electric field is $E = 500$ V/m. If the distance the electron travels through the field is 1.0 cm, how far is it deviated (Y) in its path when it emerges from the electric field? ($m_e = 9.1 \times 10^{-31}$ kg, $e = 1.6 \times 10^{-19}$ C)



- a. 2.2 mm
 b. 4.4 mm
 c. 2.2 cm
 d. 4.4 cm
 e. 0.44 mm
- _____ 7. Two point charges of values $+3.4$ and $+6.6 \mu\text{C}$ are separated by 0.10 m. What is the electrical potential at the point midway between the two point charges? ($k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- a. $+1.8 \times 10^6$ V
 b. -0.90×10^6 V
 c. $+0.90 \times 10^6$ V
 d. $+3.6 \times 10^6$ V
 e. -3.6×10^6 V
- _____ 8. A point charge of $+3.0 \mu\text{C}$ is located at the origin of a coordinate system and a second point charge of $-6.0 \mu\text{C}$ is at $x = 1.0$ m. At what point on the x axis is the electrical potential zero?
- a. -0.25 m
 b. $+0.25$ m
 c. $+0.33$ m
 d. $+0.75$ m
 e. -0.33 m
- _____ 9. Two protons, each of charge 1.60×10^{-19} C, are 2.00×10^{-5} m apart. What is the change in potential energy if they are brought 1.00×10^{-5} m closer together? ($k_e = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$)
- a. 1.15×10^{-23} J
 b. 3.20×10^{-19} J
 c. 3.20×10^{-16} J
 d. 1.60×10^{-14} J
 e. 1.60×10^{-11} J
- _____ 10. A solid conducting sphere of 10 cm radius has a net charge of 20 nC. If the potential at infinity is taken as zero, what is the potential at the center of the sphere?
- a. $36 \mu\text{V}$
 b. $360 \mu\text{V}$
 c. 1.8×10^3 V
 d. $=1.8 \times 10^4$ V
 e. $>1.8 \times 10^4$ V

- _____ 11. At which location will the electric field between the two parallel plates of a charged capacitor be the strongest in magnitude?
- near the positive plate
 - near the negative plate
 - midway between the two plates at their ends
 - midway between the two plates nearest their center
 - anywhere between the two plates
- _____ 12. A $0.25\text{-}\mu\text{F}$ capacitor is connected to a 400-V battery. Find the charge on the capacitor.
- $1.2 \times 10^{-12} \text{ C}$
 - $1.0 \times 10^{-4} \text{ C}$
 - 0.040 C
 - 0.020 C
 - 0.010 C
- _____ 13. A parallel-plate capacitor has a capacitance of $20 \mu\text{F}$. What potential difference across the plates is required to store $7.2 \times 10^{-4} \text{ C}$ on this capacitor?
- 36 V
 - $2.2 \times 10^{-2} \text{ V}$
 - $1.4 \times 10^{-8} \text{ V}$
 - 68 V
 - 18 V
- _____ 14. If two parallel, conducting plates have equal positive charge, the electric field lines will:
- leave one plate and go straight to the other plate.
 - leave both plates and go to infinity.
 - enter both plates from infinity.
 - be parallel to both plates.
 - none of the above.
- _____ 15. A $0.25\text{-}\mu\text{F}$ capacitor is connected to a 400-V battery. What potential energy is stored in the capacitor?
- $1.2 \times 10^{-12} \text{ J}$
 - $1.0 \times 10^{-4} \text{ J}$
 - 0.040 J
 - 0.020 J
 - 0.80 J

**AP physics B - Web Review ch 16 Electric Fields and Capacitance
Answer Section**

MULTIPLE CHOICE

1. A
2. B
3. B
4. B
5. B
6. B
7. C
8. C
9. A
10. C
11. D
12. B
13. A
14. B
15. D