

APPHE Practice Questions

Free community edition A | College Board AP - Turkey | 6 questions

QUESTION 1 SINGLE CHOICE

In the circuit shown, a 12 V ideal battery is connected in series with a $4\ \Omega$ resistor, a $6\ \Omega$ resistor, and a parallel combination of a $3\ \Omega$ resistor and a $6\ \Omega$ resistor. What is the power dissipated in the $3\ \Omega$ resistor?

- ☐ A $P = 1.5\text{ W}$
- ☒ B $P = 3.0\text{ W}$
- ☐ C $P = 6.0\text{ W}$
- ☐ D $P = 12.0\text{ W}$

ANSWER B

QUESTION 2 SINGLE CHOICE

A long, straight, uniformly charged wire has a linear charge density λ and is surrounded by a coaxial cylindrical Gaussian surface of radius r and length L (with $L \gg r$). What is the magnitude of the electric flux through the curved (lateral) surface of this Gaussian cylinder?

- ☐ A $\lambda / (2\pi\epsilon_0 rL)$
- ☒ B $\lambda L / (2\pi\epsilon_0 r)$
- ☐ C $\lambda / (\epsilon_0 rL)$
- ☐ D $\lambda L / (4\pi\epsilon_0 r^2)$

ANSWER B

QUESTION 3 SINGLE CHOICE

A long, straight, uniformly charged insulating rod has linear charge density λ and extends along the z-axis from $z = -L$ to $z = +L$. Which of the following expressions gives the magnitude of the electric field at a point on the perpendicular bisector of the rod at a perpendicular distance R from its midpoint?

- ☐ A $E = \lambda / (4\pi\epsilon_0 R)$
- ☒ B $E = (\lambda / 4\pi\epsilon_0 R) \cdot [2L / \sqrt{(R^2 + L^2)}]$
- ☐ C $E = \lambda L / (2\pi\epsilon_0 R^2)$
- ☐ D $E = (\lambda / 2\pi\epsilon_0) \cdot [1 / \sqrt{(R^2 + L^2)}]$

ANSWER B**QUESTION 4** SINGLE CHOICE

A rectangular loop of wire carrying current I lies in a uniform magnetic field B that points in the plane of the loop. The loop has dimensions L (horizontal) by h (vertical). What is the magnitude of the net magnetic force on the loop?

- ☐ A $B I h$
- ☐ B $B I L$
- ☒ C 0
- ☐ D $2 B I L$

ANSWER C

QUESTION 5 MULTIPLE CHOICE

In a complex resistor network connected to a battery, which of the following statements are correct at any junction (node) in the circuit according to Kirchhoff's current law? (Choose two.)

- ☒ **A** The algebraic sum of currents entering the node equals the algebraic sum of currents leaving the node.
- ☐ **B** The sum of voltage drops around any closed loop equals zero.
- ☒ **C** Charge is conserved at the node: no net accumulation of charge occurs in steady state.
- ☐ **D** The current entering any resistor equals the current leaving that same resistor, regardless of whether other branches join the node.

ANSWER **A** **C**

QUESTION 6 SINGLE CHOICE

A straight current-carrying wire of length L carries current I in a uniform magnetic field B that is perpendicular to the wire. The magnetic force on the wire has magnitude:

- ☒ **A** $F = ILB$
- ☐ **B** $F = ILB \sin \theta$ (where θ is the angle between I and B)
- ☐ **C** $F = qvB$
- ☐ **D** $F = IL^2/B$

ANSWER **A**