

Electricity Magnetism and Modern Ph (PHY102_222)

Question 1

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Flag question

For the circuit shown in the figure, find the voltage of the unknown battery E.

- ☐ a. 6.6 V
- ☐ b. 7.2 V
- ☐ c. 3.4 V
- ☐ d. 2.5 V



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Question 2

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Based on Kirchhoff's junction and loop rules as well as the directions of the currents as assigned, which of the following statements is incorrect?

- ☐ In loop adcba, $I_2R_2 + I_3R_3 = 12$
- ☐ At junction point a, $I_1 + I_2 = I_3$
- ☐ At junction point d, $I_1 + I_2 + I_3 = 0$
- ☐ In loop abcdefa, $I_2R_2 = I_1R_1 + 6$

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Question 3

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Calculate the area of the plates of a 1 pF parallel plate capacitor in a vacuum if the separation of the plates is 0.1 mm. [$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$]

- ☐ 11.3 m²
- ☐ 18.4 m²
- ☐ 14.4 m²
- ☐ 6.2 m²

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Question 4

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What is the magnetic force on a 240 mm length of wire stretched between two towers carrying a 150 A current given that the earth's magnetic field is $5 \times 10^{-5} \text{ T}$ and makes an angle of 60° with the wire?

- ☐ 15.60 N
- ☐ 156.00 N
- ☐ 1.56 N
- ☐ 1560.00 N



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Question 5

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A 7.0 mm diameter copper wire carries a current of 7.0 μA . What is the current density?

- ☐ 0.27 Am^{-2}
- ☐ 0.36 Am^{-2}
- ☐ 0.45 Am^{-2}
- ☐ 0.18 Am^{-2}

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Question 6

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If is the angle between and the perpendicular is 90 then the lines of forces are

- ☐ a. Maximum
- ☐ b. Not sure
- ☐ c. Zero
- ☐ d. None of the above

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Tutor Marked Assignment 2 (TMA2)

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Calculate the amount of charge that flows past a cross-sectional area of a conductor if a current of 0.2 A flows in it for 1 minute?

- ☐ 24 C
- ☐ 12 C
- ☐ 6 C
- ☐ 3 C

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A proton is accelerated through a potential difference of 100 V and then enters a region where it is moving perpendicular to a magnetic field $B = 0.20$ T. Calculate the radius of the circular path in which it will travel.

- ☐ a. 0.71 cm
- ☐ b. 0.37 cm
- ☐ c. 0.15 cm
- ☐ d. 0.67 cm



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Obtain the potential on the x-axis at $x = 0$ for the following point charge distributions on the x-axis:
 $200 \mu\text{C}$ at $x = 20 \text{ cm}$, $-300 \mu\text{C}$ at $x = 30 \text{ cm}$ and $-400 \mu\text{C}$ at $x = 40 \text{ cm}$.

☐ 90 V

☐ 90 V

☐ 60 V

☐ 60 V

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Question 10

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What is the equivalent capacitance between a and b?

- ☐ 3.4 μF
- ☐ 2.1 μF
- ☐ 4.6 μF
- ☐ 5.4 μF

