ALBERTA PHYSICS 30 · UNIT B · 10 QUESTIONS

Forces & Fields — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The magnitude of the electric field strength at a distance r from a point charge is 450 N/C. The magnitude of the electric field strength at a distance of 3r from the same charge is**

- **A** $4.05 \times 10^3 \ \frac{\text{N}}{\text{C}}$
- **B** 150 N/C
- **C** 450 N/C
- **D** 50 N/C

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2 **A straight wire that is 0.80 m long carries a current of 3.0 A and is oriented perpendicular to a magnetic field. The magnetic force on the wire has a magnitude of 0.36 N. The strength of the magnetic field is**

- A 0.050 T
- B 0.45 T
- C 0.15 T
- D 1.2 T

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3 **In a Millikan-type apparatus, the parallel plates are separated by 2.0 cm and are connected to a 600 V source. An oil drop that has a mass of 7.34×10^{-15} kg is suspended motionless between the plates. The number of excess electrons on the oil drop is**

ANSWER _____

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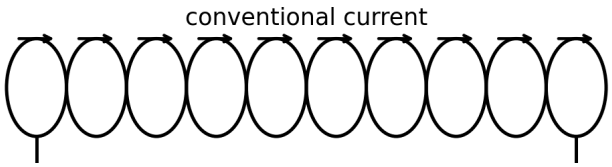
4 **The diagram shows a solenoid carrying a current. The arrows at the top of the solenoid show the direction of conventional current. The direction of electron flow at the top of the solenoid is**



A toward the left side of the page

B toward the right side of the page

C into the page

D out of the page

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5 **A charge of $+2.0 \times 10^{-6}$ C and a charge of -8.0×10^{-6} C are fixed 0.40 m apart, with the positive charge on the left. Point P lies on the line through the charges, 0.20 m to the right of the negative charge. The net electric field at P is**

- **A** $1.85 \times 10^{6} \frac{N}{C}$, toward the left
- **B** $1.75 \times 10^{6} \frac{N}{C}$, toward the left
- **C** $1.75 \times 10^{6} \frac{N}{C}$, toward the right
- **D** $1.35 \times 10^{6} \frac{N}{C}$, toward the left

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6 **A charged particle passes undeflected through a region where an electric field of $2.00 \times 10^{3} \frac{N}{C}$ and a magnetic field of 0.500 T are perpendicular to each other and to the velocity of the particle. The speed of the particle, expressed in units of $10^{3} \frac{m}{s}$ and to three significant digits, is**

ANSWER _____

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7 **In a direct current electric motor, the purpose of the commutator is to**

A reverse the direction of the current in the coil every half rotation

B increase the strength of the magnetic field around the coil

C reduce the friction between the coil and the axle

D convert the alternating current from the source into direct current

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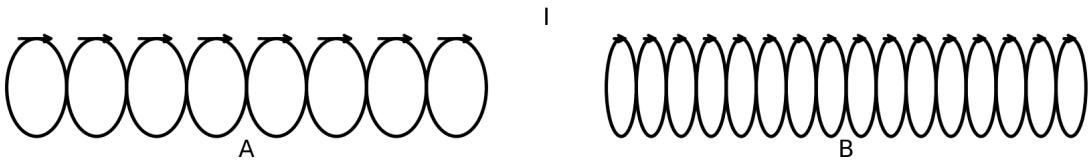
8 **The diagram shows two solenoids, A and B, carrying the same current. The solenoid that produces the stronger magnetic field at its centre is**



- **A** solenoid A
- **B** solenoid B
- **C** neither (the fields are equal)
- **D** cannot be determined

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9 **A singly ionized atom ($q = 1.60 \times 10^{-19}$ C) that has a mass of 3.32×10^{-26} kg travels in a circular path that has a radius of 0.20 m in a magnetic field that has a strength of 0.50 T. The kinetic energy of the atom is**

- **A** 1.9×10^{-15} J
- **B** 7.7×10^{-15} J
- **C** 1.5×10^{-14} J
- **D** 3.9×10^{-15} J

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10 **A negative charge moves in the direction of a uniform electric field. As the charge moves, its electric potential energy i and the electric potential that it experiences ii. The statement above is completed by the information in row**

- **A** i: increases ii: increases
- **B** i: increases ii: decreases
- **C** i: decreases ii: increases
- **D** i: decreases ii: decreases

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ANSWER KEY

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

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