B7 · Extra practice

Fields between plates | Diploma-style set of 8

Constants from the Alberta Physics 30 data sheets: $k = 8.99 \times 10^{9}$ N·m²/C², $e = 1.60 \times 10^{-19}$ C, electron mass $m_e = 9.11 \times 10^{-31}$ kg, proton mass $m_p = 1.67 \times 10^{-27}$ kg, $g = 9.81$ m/s².

Easy · B7-X01. Two parallel plates are 0.0300 m apart and connected to a 450 V battery. Find the field strength between the plates in V/m.

Response: _____

Easy · B7-X02. A charge of 2.00×10^{-6} C is in a uniform field of 3600 N/C. Find the size of the electric force on it in newtons.

Response: _____

Easy · B7-X03. Two parallel plates stay connected to the same battery. The plates are moved so the gap doubles. What happens to the field strength between them?

A. It doubles.
B. It stays the same.
C. It becomes four times larger.
D. It is cut in half.

Response: _____

Medium · B7-X04. An electron is in a uniform field of 6000 N/C. Use e = 1.60×10^{-19} C and electron mass $m_e = 9.11 \times 10^{-31}$ kg. Find its acceleration in m/s².

Response: _____

Medium · B7-X05. A proton starts from rest at the positive plate of a pair of plates 0.0250 m apart with a potential difference of 900 V. Use e = 1.60×10^{-19} C and proton mass mp = 1.67×10^{-27} kg. Find its speed at the negative plate in m/s.

Response: _____

Medium · B7-X06. A charge is released from rest in a uniform electric field. Which description of its motion is correct?

A. A straight line with constant acceleration
B. A straight line at constant speed
C. A circle at constant speed
D. A curve with changing acceleration

Response: _____

Challenging · B7-X07. An electron is released from rest at the negative plate. The plates are 0.0150 m apart with 240 V across them. Use $e = 1.60 \times 10^{-19}$ C and electron mass $m_e = 9.11 \times 10^{-31}$ kg. Find the time it takes to cross the gap, in seconds.

Response: _____

Challenging · B7-X08. A small charged ball of mass 1.60×10^{-14} kg and charge 4.80×10^{-19} C hangs motionless between horizontal parallel plates 0.0200 m apart. Use $g = 9.81$ m/s². Find the potential difference across the plates, in volts.

Response: _____