WS # 6 Chapter 25 pr 1,3,5,7,9,11, 18, 24, 36, 37, 40

Problems

1. Oppositely charged parallel plates are separated M by 5.33 mm. A potential difference of 600 V exists between the plates. (a) What is the magnitude of the electric field between the plates? (b) What is the magnitude of the force on an electron between the plates? (c) How much work must be done on the electron to move it to the negative plate if it is initially positioned 2.90 mm from the positive plate?

5. A uniform electric field W of magnitude 325 V/m is directed in the negative y direction in Figure P25.5. The coordinates of point Ⓐ are (−0.200, −0.300) m, and those of point Ⓑ are (0.400, 0.500) m. Calculate the electric potential difference $V_{Ⓑ} - V_{Ⓐ}$ using the dashed-line path.

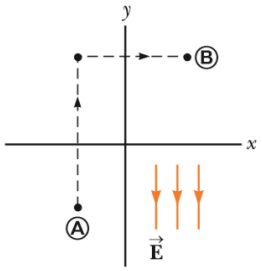
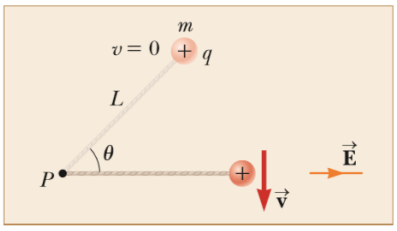


Figure P25.5

7. An electron moving parallel to the x axis has an ini- AMT tial speed of 3.70×10^6 m/s at the origin. Its speed is M reduced to 1.40×10^5 m/s at the point $x = 2.00$ cm. (a) Calculate the electric potential difference between the origin and that point. (b) Which point is at the higher potential?

9. A particle having charge $q = +2.00\ \mu$C and mass $m =$ MT 0.010 0 kg is connected to a string that is $L = 1.50$ m long and tied to the pivot point P in Figure P25.9. The particle, string, and pivot point all lie on a frictionless,

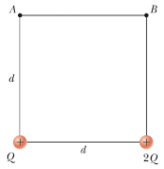


Top view

Figure P25.9

horizontal table. The particle is released from rest when the string makes an angle $\theta = 60.0°$ with a uniform electric field of magnitude $E = 300$ V/m. Determine the speed of the particle when the string is parallel to the electric field.

18. The two charges in Figure P25.18 are separated by a distance $d = 2.00$ cm, and $Q = +5.00$ nC. Find (a) the electric potential at A, (b) the electric potential at B, and (c) the electric potential difference between B and A.



24. Show that the amount of work required to assemble four identical charged particles of magnitude Q at the corners of a square of side s is $5.41 k_e Q^2/s$.

36. Figure P25.36 represents a graph of the electric potential in a region of space versus position x, where the electric field is parallel to the x axis. Draw a graph of the x component of the electric field versus x in this region.

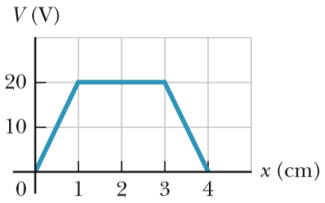
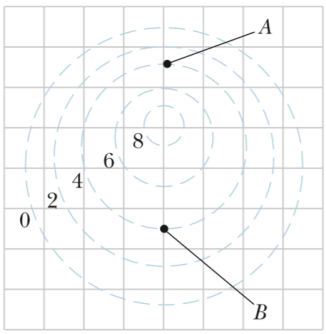


Figure P25.36

37. The potential in a region between $x = 0$ and $x = 6.00$ m W is $V = a + bx$, where $a = 10.0$ V and $b = -7.00$ V/m. Determine (a) the potential at $x = 0$, 3.00 m, and 6.00 m and (b) the magnitude and direction of the electric field at $x = 0$, 3.00 m, and 6.00 m.

40. Figure P25.40 shows several equipotential lines, each labeled by its potential in volts. The distance between the lines of the square grid represents 1.00 cm. (a) Is the magnitude of the field larger at A or at B? Explain how you can tell. (b) Explain what you can determine



Numerical values are in volts.

Figure P25.40

about $\vec{E}$ at B. (c) Represent what the electric field looks like by drawing at least eight field lines.

1) 1.13E5 N/C, 1.80E-14 N, 4.37E-17 J 5) 260 V 7) -38.9 V, Origin 9) 0.300 m/s
18) 658 V 36) (20, 0, -20) v/cm 37) 10 V, -11 V, -32 V, 7 V/m 40) A > B, 200 V/m down