PHYSICS 6B
Ch.17 Worksheet

1) In a certain region of space the electric potential V is known to be constant. Is the electric field in this region (a) positive, (b) zero, or (c) negative?

2) Find the change in electric potential energy as charges of (a) $2.2 \times 10^{-6}$ C and (b) $-1.1 \times 10^{-6}$ C moves from a point A to a point B, given that the change in electric potential between these points is $\Delta V = V_B - V_A = 24$ V.

3) A particle with mass $m = 1.75 \times 10^{-5}$ kg and charge $q = 3.20 \times 10^{-6}$ C initially passes through point A, moving toward point B at speed $5.00$ m/s. $\Delta V = V_B - V_A = 60.0$ volts.
What is the speed of the particle at point B?

4) A $+1.2 \mu$C charge and a $-1.2 \mu$C charge are placed at positions $(0.5m,0)$ and $(-0.5m,0)$, as shown in the figure. At which of the points A, B, C, or D is the electric potential smallest in value? At which of these points does it have its greatest value? Calculate the electric potential at points A, B, C, and D.
5) Two capacitors, one 12.0 µF and other of unknown capacitance C, are connected in parallel across a battery with an emf of 9 V. The total energy stored in the two capacitors is 0.0115 J. Find the unknown capacitance C.

6) Two capacitors in series are connected to a capacitor in parallel. The two capacitors in series have capacitance’s C₁=10 µF, C₂=5 µF, and the capacitor in parallel to both of these has a capacitance of 20 µF. Find the equivalent capacitance of this circuit and the total energy stored in the capacitors when connected to a 12-volt battery.

7) A parallel-plate capacitor is connected to a battery that maintains a constant potential difference V between the plates. If the plates of the capacitor are pulled farther apart, do the following quantities increase, decrease, or remain the same?
   (a) the electric field between the plates
   (b) the charge on the plates
   (c) the capacitance
   (d) the energy stored in the capacitor

8) The plates of a parallel-plate capacitor have constant charge +Q and −Q. Do the following quantities increase, decrease, or remain the same when a dielectric is inserted between the plates?
   (a) the electric field between the plates
   (b) the potential difference between the plates
   (c) the capacitance
   (d) the energy stored in the capacitor