

Electric Potential and Capacitance- Problems

Example 1

Three point-charges of 1 C, 2 C and 3 C are placed at the corners of an equilateral triangle of side 1 m. Find the work done to move these charges to the corners of a similar equilateral triangle of side 0.5 m.

Example 2

Two charges 5×10^{-8} C and -3×10^{-8} C are located 16 cm apart. At what point(s) on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero. (NCERT Exercise)

Example 3

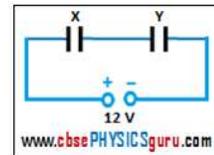
A charge of 8 mC is located at the origin. Calculate the work done in taking a small charge of -2×10^{-9} C from a point P (0, 0, 3 cm) to a point Q (0, 4 cm, 0), via a point R (0, 6 cm, 9 cm). (NCERT Exercise)

Example 4

A parallel plate air capacitor has capacitance of 8 pF. What will be the capacitance if the distance between the plates be reduced by half and the space between them is filled with a substance of dielectric constant $K = 6$? (NCERT Exercise)

Example 5

Two parallel plate capacitors X and Y as shown in figure, have the same area of plates and same separation between them. X has air between the plates while Y contains a dielectric medium of $K = 4$. (i) Calculate capacitance of each capacitor if equivalent capacitance of the combination is $4 \mu\text{F}$. (ii) Calculate the potential difference between the plates of X and Y. (iii) What is the ratio of electrostatic energy stored in X and Y?



Example 6

A dielectric slab of dielectric constant K is inserted between the plates of a parallel plate capacitor with battery remaining connected to it. What will be the effect on (a) capacitance (b) charge (c) potential energy stored (d) electric field between the plates?

Example 7

N identically charged drops are joined to form bigger drop. By what factor the charge and potential change?

Example 8

Obtain the equivalent capacitance of the network in figure. For a 300 V supply, determine the charge and voltage across each capacitor. (NCERT Exercise)

