GRADE XII PHYSICS

1. 5 J of work is done in moving a positive charge of 0.5 C between two points. What is the potential difference between these two points ?
2. A charge of 2 C moves between two points maintained at a potential difference of 1 volt. What is the energy acquired by the charge ?
3. How much work is done in moving a 500 μC charge between two points on an equipotential surface ?
4. An air capacitor is given a charge of 2 μC raising its potential to 200 V. If on inserting a dielectric medium, its potential falls to 50 V, what is the dielectric constant of the medium ?
5. A parallel plate capacitor with air between the plates has a 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 $\kappa = 6$?
6. A 500 μC charge is at the centre of a square of side 10 cm. Find the work done in moving a charge of 10 μC between two diagonally opposite points on the square.
7. In which orientation, a dipole placed in a uniform electric field is in (i) stable, (ii) unstable equilibrium ?
8. Draw the equipotential surfaces due to an electric dipole. Locate the points where the potential due to the dipole is zero.
9. An electric dipole is held in a uniform electric field $\vec{E}$. (a) Show that the net force acting on it is zero. (b) The dipole is aligned with its dipole moment $\vec{p}$ parallel to the field $\vec{E}$. Find : (i) the work done in turning the dipole till its dipole moment points in the direction opposite to $\vec{E}$. (ii) the orientation of the dipole for which the torque acting on it becomes maximum.
10. Two capacitors with capacity C1 and C2 are charged to potential V1 and V2 respectively and then connected in parallel. Calculate the common potential across the combination, the charge on each

capacitor, the electrostatic energy stored in the system and the change in the electrostatic energy from its initial value.

11. A parallel plate capacitor of capacitance C is charged to a potential V. It is then connected to another uncharged capacitor having the same capacitance. Find out the ratio of the energy stored in the combined system to that stored initially in the single capacitor.
12. A slab of material of dielectric constant κ has the same area as the plates of a parallel plate capacitor but has a thickness 3d/4 . Find the ratio of the capacitance with dielectric inside it to its capacitance without the dielectric.
13. Obtain an expression for the work done to dissociate the system of three charges placed at the vertices of an equilateral triangle of side 'a'.
14. A fully charged parallel plate capacitor is connected across an uncharged identical capacitor. Show that the energy stored in the combination is less than that stored initially in the single capacitor.
15. Would the electric field be necessarily zero at a point where the electric potential is zero ? Give an example to illustrate your answer.