

BRAIN INTERNATIONAL SCHOOL

PHYSICS ASSIGNMENT

CLASS 12

Apr-May 18

- 1) State coulombs law in electrostatics . explain the same in SI units.
- 2) Two point charges $+4e$ and $+e$ are fixed 'a' distance apart. Where should a third charge q be placed on the line joining the two charges so that it may be in equilibrium.
- 3) Three charges q , q , $-q$ are placed at the three vertices A, B, C respectively of a triangle . What is the force on each charge .
- 4) An electron moves a distance of 6 cm when accelerated from rest by an electric field of strength 2×10^4 N/C. Calculate the time of travel.
- 5) Calculate the magnitude of electric field which can just balance a deuteron of mass 3.2×10^{-27} kg. Take $g = 10 \text{ m/sec}$.
- 6) Obtain the formula for the electric field due to a long thin wire of uniform linear charge density without using Gauss law.
- 7) Two point charges of $+16 \mu\text{C}$ and $-9 \mu\text{C}$ are placed 8 cm apart in air. Determine the position of the point at which the resultant field is zero.
- 8) Determine the electric field produced by a helium nucleus at a distance of 1 \AA from it.
- 9) Derive expression for the electric field at any point on the equatorial line of an electric dipole.
- 10) Define electric flux. Also state and prove Gauss law.
- 11) A circular plane sheet of radius 10 cm is placed in a uniform electric field of 5×10^5 N/C, making an angle of 60 degree with the field . Calculate electric flux through the sheet.
- 12) Apply Gauss law to show that for a spherical shell, the electric field inside the shell vanishes whereas outside it ,the field is as if all the charges had been concentrated at the centre.
- 13) A Charge Of 17.7×10^{-4} C is distributed uniformly over a large sheet of area 200 m^2 . Calculate the electric field at a distance of 20 cm from it in air.
- 14) Derive the relation that electric field at any point is equal to the negative of the potential gradient at that point.
- 15) Derive an expression for the potential energy of a dipole in a uniform electric field. Also discuss the condition of stable and unstable equilibrium.
- 16) Determine the electrostatic potential energy of a system consisting of two charges $7 \mu\text{C}$ and $-2 \mu\text{C}$ at $(-9\text{cm}, 0, 0)$ and $(9\text{cm}, 0, 0)$ respectively.
- 17) In the above question how much work is required to separate the two charges infinitely away from each other .
- 18) Derive expression for the capacitance of a parallel plate capacitor when a dielectrics of thickness t is inserted between them.
- 19) Derive expression for the electric field due to a charge distributed in a ring of radius r .
- 20) Find the value of loss of energy when two capacitors are connected by a wire .