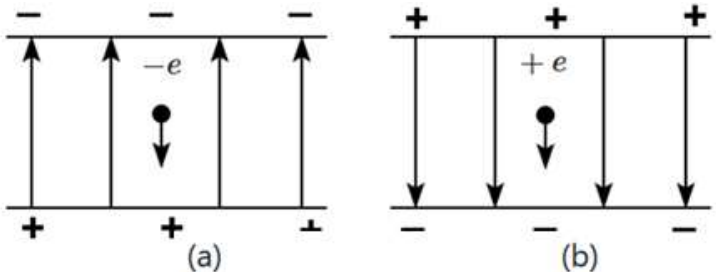
WORKSHEET -1
CLASS -12
(PHYSICS)

Duration: 30 min

Ch-1 Electric charge, field and flux

Q.1. An electron falls through a distance of 1.5 cm in a uniform electric field of magnitude 2.0×10^4 N C^{-1} [Fig. 1.10(a)]. The direction of the field is reversed keeping its magnitude unchanged and a proton falls through the same distance [Fig. 1.10(b)]. Compute the time of fall in each case. Contrast the situation with that of 'free fall under gravity'.

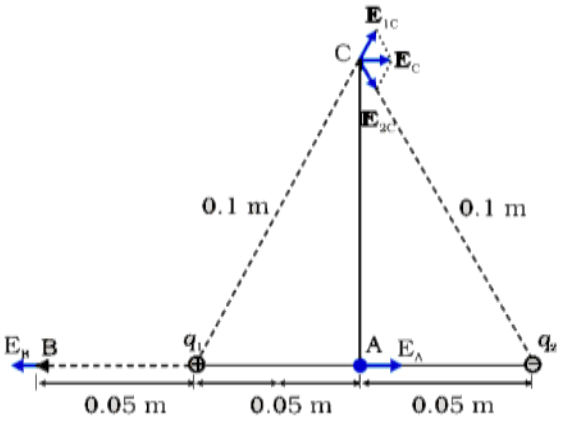


Q.2. (i) Deduce an expression for the electric field at a point on the axial line of an electric dipole of length 2a.

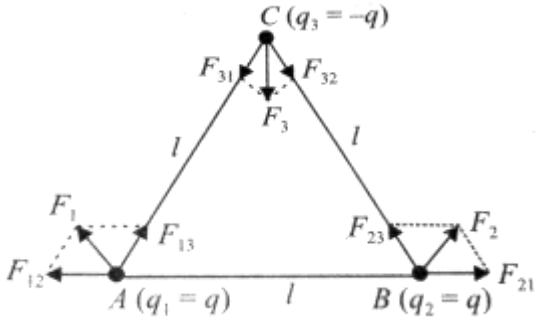
(ii) An electric dipole is kept in a uniform electric field. Derive an expression for the net torque acting on it and write its direction. State the conditions under which the dipole is in

(a) Stable equilibrium (b) Unstable equilibrium.

Q.3. Two point charges q_1 and q_2, of magnitude $+10^{-8}$ C and -10^{-8} C, respectively, are placed 0.1 m apart. Calculate the electric fields at points A, B and C shown in Fig. 1.11.



Q.4. Consider the charges q, q, and $-q$ placed at the vertices of an equilateral triangle, as shown in Fig. 1.7. What is the force on each charge?



Q.5. The electric field components in Fig. 1.24 are $Ex = \alpha x^{1/2}$, $E_y = E_z = 0$, in which $\alpha = 800$ N/C m$^{1/2}$. Calculate (a) the flux through the cube, and (b) the charge within the cube. Assume that $a = 0.1$ m.