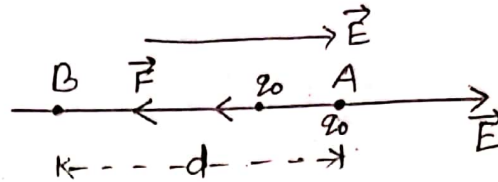


TOPIC:- Relation between Electric field ( $\vec{E}$ ) and Electric potential (V)



Let us suppose that two point A and B are situated in a uniform electric field  $\vec{E}$ . The separation between them is  $d$ . The electric force on the positive test charge  $q_0$  is  $q_0 E$  and points in right direction. Let us now move the test charge  $q_0$  from A to B. To do this we have to apply an external force  $\vec{F}$  of the same magnitude and in left direction. The work done by the agent producing this force is

$$W_{AB} = F \cdot d \\ = q_0 E d$$

potential difference between A and B

$$V_B - V_A = \frac{W_{AB}}{q_0} \\ = \frac{q_0 E d}{q_0}$$

$\therefore \boxed{V_B - V_A = E d}$  This is required equation