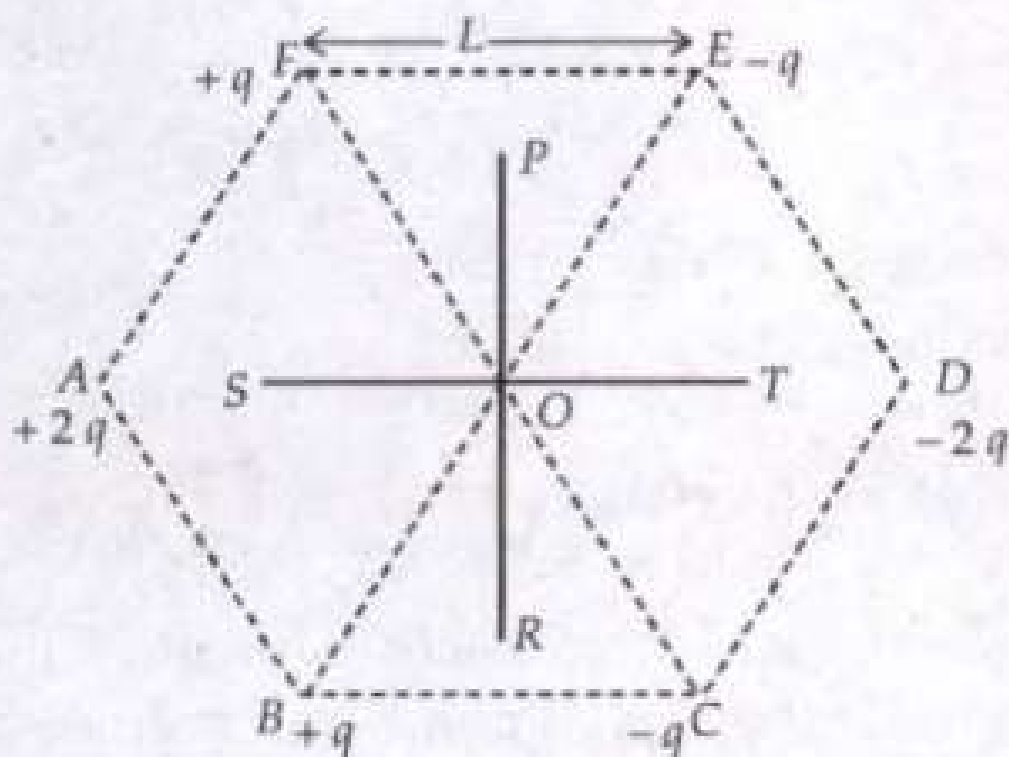


Six point charges are kept at the vertices of a regular hexagon of side  $L$  and centre  $O$ , as shown in the figure. Given

that  $K = \frac{1}{4\pi\epsilon_0} \frac{q}{L^2}$ , which of the following statement(s) is (are) correct? [2012]



- (a) The electric field at  $O$  is  $6K$  along  $OD$
- (b) The potential at  $O$  is zero
- (c) The potential at all points on the line  $PR$  is same
- (d) The potential at all points on the line  $ST$  is same

(a) Resultant of  $2K$  and  $2K$  (at  $120^\circ$ ) is also  $2K$  towards  $4A$ . Therefore, net electric field is  $6A$ .

$$(b) V_0 = \frac{1}{4\pi\epsilon_0} \left[ \frac{q_A}{L} + \frac{q_B}{L} + \frac{q_C}{L} + \frac{q_D}{L} + \frac{q_E}{L} + \frac{q_F}{L} \right]$$

$$= \frac{1}{4\pi\epsilon_0} (q_A + \dots + q_F)$$

$$= 0$$

Because  $q_A + q_B + q_C + q_D + q_E + q_F = 0$

(c) Only line  $PR$ . potential is same ( $= 0$ ).

