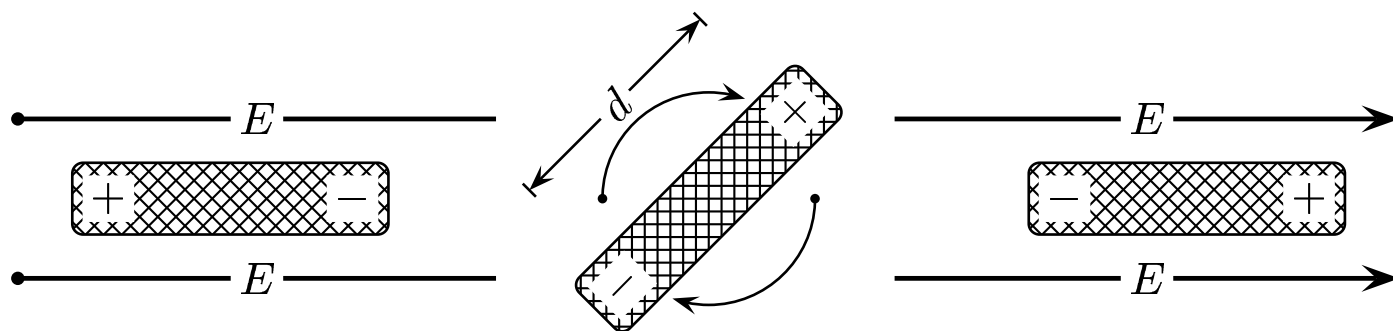


A dipole with charge  $+q$  and  $-q$  separated by a distance  $d$  is placed in a uniform field  $\vec{E}$ .



Determine the net force  $F_{net}$  on the dipole, and the potential energy  $U$  released in flipping the dipole from the left-hand figure to the right-hand figure.

- A)  $F = 0$             and         $|\Delta U| = q E d$
- B)  $F = 0$             and         $|\Delta U| = 2 q E d$
- C)  $F = 2 q E$         and         $|\Delta U| = 2 q E d$
- D)  $F = 2 q E$         and         $|\Delta U| = 4 q E d$

Electric forces on the two charges asserted by the electric field are equal in magnitude and opposite in direction; *i.e.*,  $F = 0$ .

For the  $+q$  charge the potential energy released is  $\Delta U = q E d$ . The  $-q$  charge displacement releases the same potential energy; *i.e.*, for both charges  $|\Delta U| = 2 q E d$ .

Answer **B**.

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