

### Answer on Question #47461-Engineering-Other

Two large horizontal metal plates are separated by  $d = 4 \text{ mm} = 4 \cdot 10^{-3} \text{ m}$ . The lower plate is at potential of  $U_0 = -6 \text{ V}$ . What potential should be applied to the upper plate to create electric field strength of  $E = 4000 \frac{\text{V}}{\text{m}}$  upwards in the space between the plates?

#### Solution

The electric field points from regions of higher potential to regions of lower potential. Since electric field is upwards, therefore upper plate is at lower potential than the lower plate.

Let the potential of upper plate is  $U$ .

Magnitude of potential difference between the plates is  $U_0 - U$ .

$$E = \frac{U_0 - U}{d}.$$

The potential of upper plate is

$$U = U_0 - Ed = -6 - 4000 \cdot 4 \cdot 10^{-3} = -22 \text{ V}.$$

**Answer:  $-22 \text{ V}$ .**