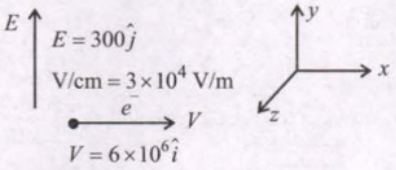
QUES 04:-

An electron is moving along $+x$ direction with a velocity of 6×10^6 ms^{-1}. It enters a region of uniform electric field of 300 V/cm pointing along $+y$ direction. The magnitude and direction of the magnetic field set up in this region such that the electron keeps moving along the x direction will be : [Main Sep. 06, 2020 (I)]

(a) 3×10^{-4} T, along $+z$ direction
(b) 5×10^{-3} T, along $-z$ direction
(c) 5×10^{-3} T, along $+z$ direction
(d) 3×10^{-4} T, along $-z$ direction

4. **(c)** $\vec{E} = 300\hat{j}$ V/cm $= 3 \times 10^4$ V/m

$\vec{V} = 6 \times 10^6 \hat{i}$



$\vec{B}$ must be in $+z$ axis.

$q\vec{E} + q\vec{V} \times \vec{B} = 0$

$E = VB$

$$\therefore B = \frac{E}{V} = \frac{3 \times 10^4}{6 \times 10^6} = 5 \times 10^{-3} T$$

Hence, magnetic field $B = 5 \times 10^{-3}$ T along $+z$ direction.