Physics
Theory Part 28

Topics: Waves and Oscillation/ Optics

Course: B.Sc/ Physics

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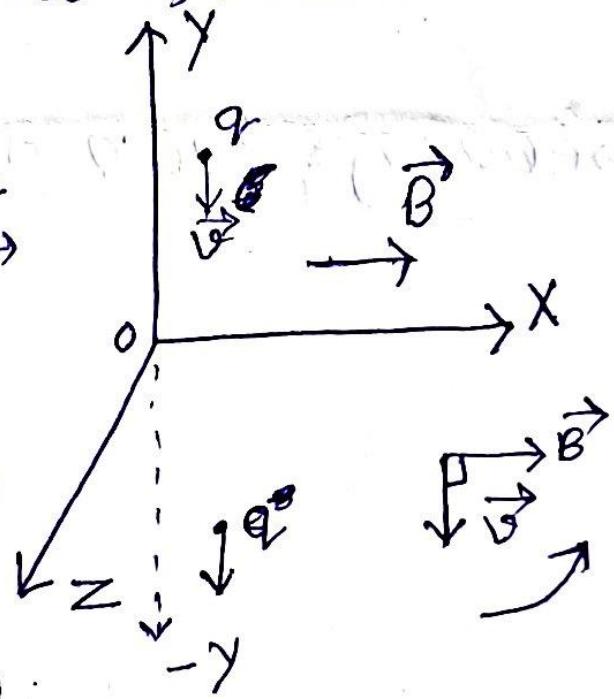
From given fig. Find the direction for electron moving along $-Y$ axis, $\vec{B}$ along X axis.

Lorentz Force is

$$\vec{F} = q(\vec{v} \times \vec{B}) \quad ; q = +ve \qquad \text{——— (1)}$$

Here direction of $\vec{F}$ is given by Right Hand rule or cross Product rule.



$$W = \vec{F} \cdot \vec{d}$$

$$=$$

for eq (1) $\vec{F} \perp (\vec{v}, \vec{B})$

In the given system $\vec{F}$ is along $+Z$ axis.

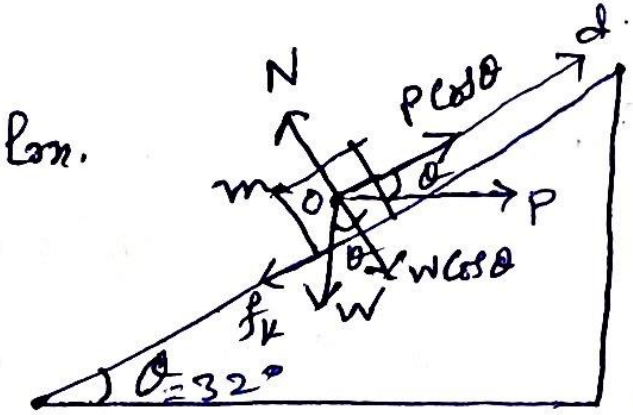
But since here q is $-ve$ (i,e electron) so actual direction of $\vec{F}$ is reversed i,e $-Z$ axis.

So Ans. is $(-Z)$

A Body is moving up along a ramp. Mass of the body is 2.5 kg, $\mu_k = 0.35$, $\theta = 32°$
From Free Body Diagram find the work done in moving the body by distance $d = 0.44$ m

Apply Newton's 2nd Law

$P\cos\theta - f_k = ma$, where a = acclon.



or, $a = \frac{275 \times \cos 32° - 7.27}{2.5} = \frac{233.2 - 7.27}{2.5}$

$= 90.37 \text{ m/s}^2$

so, net force acting on body, $F = ma$

$\therefore F = 2.5 \times 90.37 = 225.92$ N

$\therefore$ Work done, $W = F \times d = 225.92 \times 0.44$

$\boxed{W = 99.407 \text{ J}}$

$f_k = \mu_k N = \mu_k mg\cos\theta$

$= 0.35 \times 2.5 \times 9.8 \times \cos 32°$

$= 7.27$ N

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