

NCERT/CBSE PHYSICS CLASS 12 textbook

<http://www.TutorBreeze.com>

Answers to NCERT/CBSE PHYSICS Class 12(Class XII)textbook Exercise and Additional exercise

CHAPTER FOUR

MOVING CHARGES AND MAGNETISM

EXERCISES

(For simplicity in numerical calculations, take $g = 10 \text{ m s}^{-2}$)

4.21 A straight horizontal conducting rod of length 0.45 m and mass 60 g is suspended by two vertical wires at its ends. A current of 5.0 A is set up in the rod through the wires.

(a) What magnetic field should be set up normal to the conductor in order that the tension in the wires is zero?

(b) What will be the total tension in the wires if the direction of current is reversed keeping the magnetic field same as before?

(Ignore the mass of the wires.) $g = 9.8 \text{ m s}^{-2}$.

$$4.21 \quad (a) \quad b = 0.45 \text{ m}, \quad m = 60 \times 10^{-3} \quad i = 5.0 \text{ A}$$

$$F = ibB$$

As the mass is suspended by two wires

$$2T + F = mg$$

$$2T + ibB$$

$$\text{As } T = 0$$

$$ibB = mg$$

$$5(0.45)(B) = 60 \times 10^{-3} \times 10$$

$$B = \frac{6 \times 10^{-1}}{5 \times 0.45} = 0.27 \text{ T}$$

(b) If current direction is reversed then direction of force will also reverse.

$$2T = mg + F$$

$$2T = 60 \times 10^{-3} \times 10 + (5)(0.45)(0.27) = 1.2 \text{ N}$$

©TutorBreeze.com

Please do not copy the answer given here

[Write to us for help in understanding the solution](#)