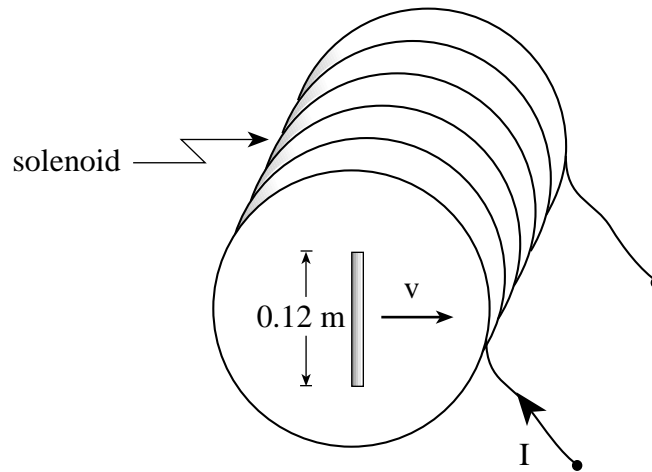


6. A solenoid of length 0.85 m has a radius of 0.10 m . A current of 25 A flows through its 7 600 turns. Within this solenoid, a 0.12 m wire moves as shown and develops an emf of 0.055 V across its ends.



With what speed does the wire move perpendicular to the solenoid's magnetic field? (7 marks)

$$\mathcal{E} = Bl_w v \quad \leftarrow \text{2 marks}$$

$$v = \frac{\mathcal{E}}{Bl_w} = \frac{\mathcal{E}}{\left(\mu_0 \frac{N}{l_s} I\right) l_w} = \frac{0.055}{(4\pi \times 10^{-7}) \left(\frac{7600}{0.85}\right) (25)(0.12)} = 1.6 \text{ m/s} \quad \leftarrow \text{2 marks}$$

↑
3 marks

