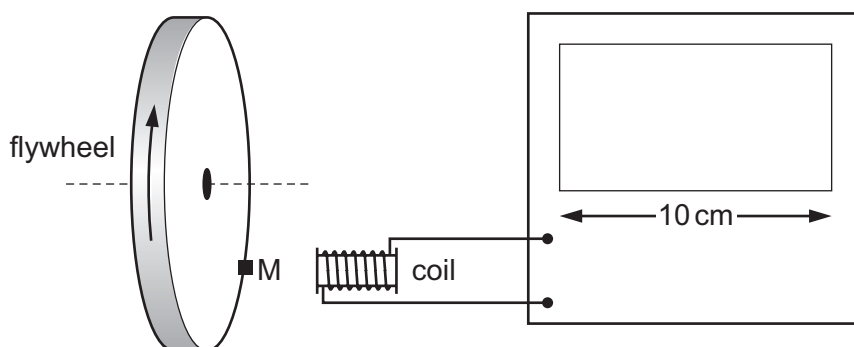


- 4 The diagram shows a cathode-ray oscilloscope (c.r.o.) being used to measure the rate of rotation of a flywheel.



The flywheel has a small magnet M mounted on it. Each time the magnet passes the coil, a voltage pulse is generated, which is passed to the c.r.o. The display of the c.r.o. is 10 cm wide. The flywheel is rotating at 3000 revolutions per minute.

Which time-base setting will display clearly separate pulses on the screen?

- A**  $1 \text{ s cm}^{-1}$       **B**  $10 \text{ ms cm}^{-1}$       **C**  $100 \mu\text{s cm}^{-1}$       **D**  $1 \mu\text{s cm}^{-1}$
- 5 A student determines the density  $\rho$  of steel by taking measurements from a steel wire.

$$\text{mass } m = 6.2 \pm 0.1 \text{ g}$$

$$\text{length } l = 25.0 \pm 0.1 \text{ cm}$$

$$\text{diameter } d = 2.00 \pm 0.01 \text{ mm}$$

He uses the equation  $\rho = \frac{4m}{\pi d^2 l}$ .

What is the percentage uncertainty in his calculated value of density?

- A** 1.1%      **B** 1.8%      **C** 2.5%      **D** 3.0%