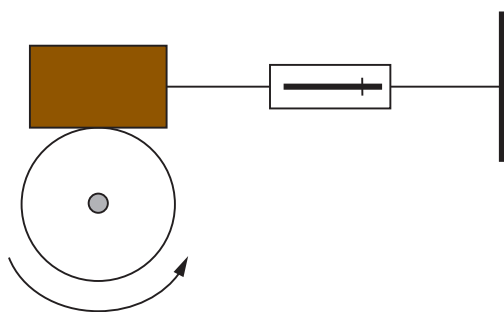


Self-test questions

Topic 1

- 1 The speed of sound in air is 340 m s^{-1} . The thunder from a lightning strike is heard 10 seconds after the lightning is seen. What is the distance to the point where lightning struck?
A 170 m
B 340 m
C 1700 m
D 3400 m
- 2 Which of the following is the best estimate for the angular frequency of rotation of the Earth around the Sun in radians per second?
A $\frac{2\pi}{365}$
B $\frac{2\pi}{365 \times 24}$
C $\frac{2\pi}{365 \times 24 \times 60}$
D $\frac{2\pi}{365 \times 24 \times 3600}$
- 3 The resistance force experienced by a sphere of radius r falling in a liquid with speed v is given by $F = 6\pi\eta rv$ where η is a constant. What is the unit of η ?
A $\text{kg m}^{-2} \text{s}^{-2}$
B $\text{kg m}^{-1} \text{s}^{-2}$
C $\text{kg m}^{-2} \text{s}^{-1}$
D $\text{kg m}^{-1} \text{s}^{-1}$
- 4 A block connected by a string to a spring balance is placed on top of a rotating disc as shown in the diagram.



This apparatus may be used to measure:

- A** the force of static friction between the block and the disc
- B** the force of kinetic friction between the block and the wheel
- C** the normal reaction between the block and the disc
- D** the weight of the block

5 Two lengths, x and y , are measured as $x = (11 \pm 1)$ cm and $y = (9 \pm 1)$ cm. In which of the following calculated quantities is the percentage uncertainty the greatest?

- A $x + y$
- B $x - y$
- C xy
- D $\frac{x}{y}$

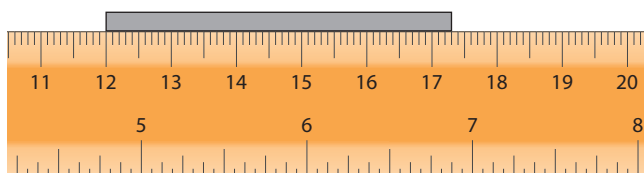
6 The volume of a sphere of radius R is given by $V = \frac{4\pi R^3}{3}$. The radius is measured with a percentage uncertainty of 3%. What is the percentage uncertainty in V ?

	V
A	9%
B	12%
C	27%
D	36%

7 In an experiment it is expected that y depends on x according to $y = ax^2 + bx$ where a and b are constants. A straight line would be obtained by plotting:

- A y versus x
- B y versus x^2
- C y/x versus x
- D y/x versus $1/x$

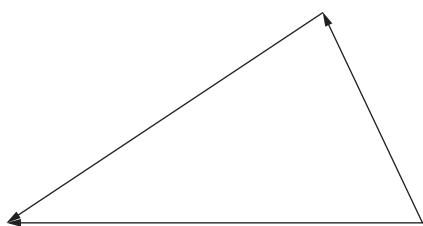
8 The ruler is marked in cm. What is the best estimate of the length of the grey object including its uncertainty?



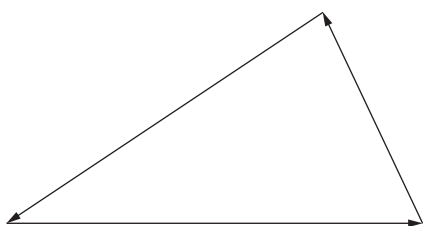
- A (4.75 ± 0.05) cm
- B (4.8 ± 0.1) cm
- C (4.8 ± 0.10) cm
- D (4.8 ± 0.05) cm

9 In which of the following is the net force zero?

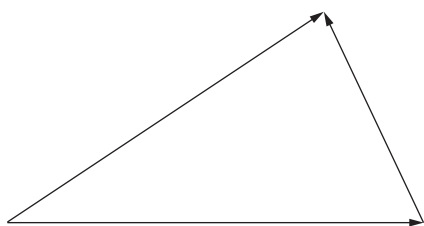
A



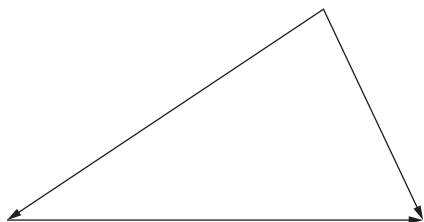
B



C



D



A

B

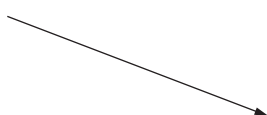
C

D

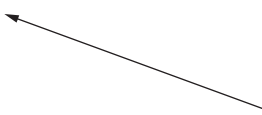
10 The diagram shows two vectors a and b .

Which vector represents the difference $a - b$?

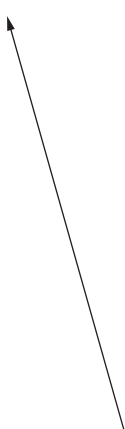
A



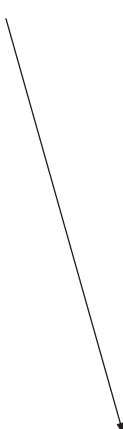
C



B



D



A

B

C

D