

## Section A: Mechanics

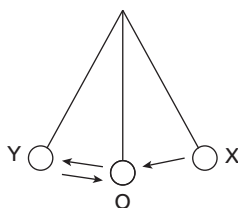
### A1 Scientific method and measurement

- 1 The professor who first implemented a scientific approach in order to investigate a problem, and who is often referred to as ‘the father of scientific methodology’, is
- (A) Galileo (A)
- (B) Democritus (B)
- (C) Newton (C)
- (D) Einstein (D)

- 2 The bob of a simple pendulum makes 20 complete swings in 40 seconds. Which of the following correctly states the period and frequency of its oscillations?

	Period/s	Frequency/Hz	
(A)	0.50	2.0	(A)
(B)	2.0	0.25	(B)
(C)	2.0	0.50	(C)
(D)	20	0.025	(D)

Item 3 refers to the diagram below. The bob of the pendulum takes 0.15 seconds to swing from X to Y and then to O.



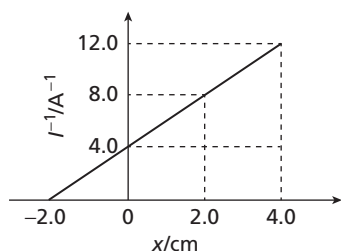
- 3 The frequency of its oscillation is
- (A) 0.15 Hz (A)
- (B)  $5.0 \text{ s}^{-1}$  (B)
- (C) 0.20 Hz (C)
- (D)  $0.80 \text{ s}^{-1}$  (D)

## A1 Scientific method and measurement (cont.)

4 A simple pendulum consisting of a small bob suspended by a long, light string oscillates with small angular amplitude. Which of the following adjustments could result in it obtaining an increased period?

- (A) Increasing the length of the string (A)
- (B) Decreasing the length of the string (B)
- (C) Decreasing the amplitude of the oscillations by a small amount (C)
- (D) Using a bob of different mass (D)

Items 5–6 refer to the following graph.



5 The value of  $I^{-1}$  when  $x = 0$  is

- (A) -2.0 cm (A)
- (B)  $4.0 \text{ A}^{-1}$  (B)
- (C) 2.0 cm (C)
- (D)  $12.0 \text{ A}^{-1}$  (D)

6 The slope of the graph is

- (A)  $4.0 \text{ A}^{-1} \text{ cm}$  (A)
- (B)  $6.0 \text{ A}^{-1} \text{ cm}$  (B)
- (C)  $4.0 \text{ A}^{-1} \text{ cm}^{-1}$  (C)
- (D)  $2.0 \text{ A}^{-1} \text{ cm}^{-1}$  (D)

- 7 The width of a desk was measured using a metre rule having intervals of 1 mm. Which of the following is MOST appropriate for expressing the result?
- (A) 0.524 m (A)
- (B) 0.5254 m (B)
- (C) 0.53 m (C)
- (D) 52 cm (D)
- 8 A force of 290 N acts on an area of  $1.2 \text{ m}^2$ . A student uses his calculator, which displays the result as 241.6666667. The pressure is BEST represented as
- (A) 241.6 Pa (A)
- (B) 240 Pa (B)
- (C) 242 Pa (C)
- (D) 241.666 6667 Pa (D)
- 9 5.345 expressed to TWO significant figures is
- (A) 5.35 (A)
- (B) 5.4 (B)
- (C) 5.3 (C)
- (D) 53 (D)
- 10 The area of a rectangle of length 200 cm and width 80 cm is
- (A)  $1600 \text{ cm}^2$  (A)
- (B)  $16\,000 \text{ m}^2$  (B)
- (C)  $1.6 \text{ m}^2$  (C)
- (D)  $160 \text{ cm}^2$  (D)