

Question 1 (Answer: **D**)

- A ball's widest point cannot be lined up against a ruler directly.
- Place two flat blocks or set squares either side of the ball, just touching it.
- The distance between them, read off the ruler, is the diameter.

Question 3 (Answer: **B**)

- A region in which a mass experiences a force is a *field*.
- For gravity that is the gravitational field.
- Charge belongs to electric fields, and gravitational potential energy is a quantity, not a region.

Question 1 (Answer: **A**)

- A vector has direction as well as size.
- Acceleration is a rate of change of velocity and force acts in a direction, so both are vectors.
- Density and pressure have no direction, so they are scalars.

Question 1 (Answer: **A**)

- Passing the marker *from the same direction* happens once per complete swing, so each pass is one period.
- 12 periods take $138 - 90 = 48$ s.
- $T = 48/12 = 4.0$ s.

1(a)(i)	scalar has magnitude (size) <u>only</u> OR vector has (magnitude and) direction
1(a)(ii)	mass, energy and temperature all correct and no additional quantities 2 marks 2 correct and no additional quantities 1 mark
1(b)(i)	decrease in kinetic energy = increase in gravitational (potential) energy OR $\frac{1}{2}mv^2 = mg(\Delta)h$ $v^2 = 2gh$ OR $v^2 = 2 \times 9.8 \times 5.0$ OR $v^2 = 98$ $v = \sqrt{98}$ OR 9.899
1(b)(ii)	0.57 kg m / s (upwards) OR 0.57 Ns (upwards) (momentum =) mv OR $5.8 \times 10^{-2} \times 9.9$

1(a)	(only) acceleration AND velocity circled
1(b)(i)	56 m / s braille: 55 m / s
1(b)(ii)	accelerates OR speed increases AND (then) constant speed AND (then) decelerates OR speed decreases <u>constant</u> acceleration OR <u>constant</u> deceleration
1(b)(iii)	26 000 m OR 26 km braille: 26 125 m (distance =) area under the speed–time graph OR (distance =) <u>average</u> speed $\times$ time taken $0.5 \times 80 \times 56$ AND 56×400 AND $0.5 \times 50 \times 56$ OR $\frac{1}{2} \times \{400 + 530\} \times 56$ braille: $0.5 \times 100 \times 55$ AND 55×400 AND $0.5 \times 50 \times 55$ OR $\frac{1}{2} \times \{400 + 550\} \times 55$
1(b)(iv)	any one from: • lower acceleration OR less acceleration • lower deceleration OR less deceleration • lower maximum speed OR lower average speed OR lower constant speed

Question 1 (Answer: **A**)

- A vector has both size and direction; a scalar has size only.
- Mass and energy have no direction, so they are scalars.
- Weight is a force and acceleration is a rate of change of velocity, so both are vectors.

Question 1 (Answer: **D**)

- A vector has direction as well as size.
- Weight is a force, and forces always act in a particular direction.
- Density, mass and pressure are all scalars – they have size only.