P3.1 Mastery Quiz: Acceleration

Section A

1. Choose which of the following is a vector quantity. [1]

Tick (✓) **one** box.

A. Speed ☐

B. Weight ☐

C. Mass ☐

2. Choose the best definition of **acceleration**. [1]

Tick (✓) **one** box.

A. Change in velocity ☐

B. Increase in speed ☐

C. Change in direction ☐

3. Newton's Third Law states that … [1]

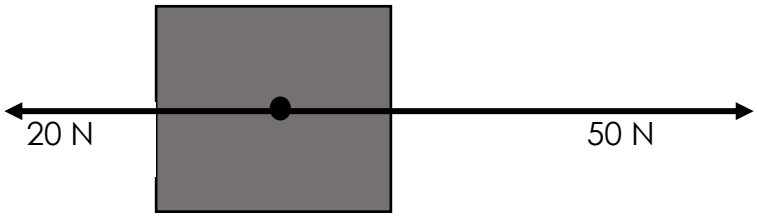
Tick (✓) **one** box.

A. an object has the same motion unless an unbalanced force acts on it. ☐

B. every action has an equal and opposite reaction. ☐

C. stationary objects have no forces acting on them. ☐

4. Use the diagram below to answer questions 4(a) and 4(b).



(a) If object in the diagram was initially **stationary**, choose the option that best describes the motion as a result of these forces. [1]

Tick (✓) **one** box.

A. The object will move at a constant speed towards the right ☐

B. The object will accelerate towards the right ☐

C. The object will remain stationary ☐

(b) If object in the diagram was initially **moving at a constant speed towards the left**, choose the option that best describes the motion as a result of these forces. [1]

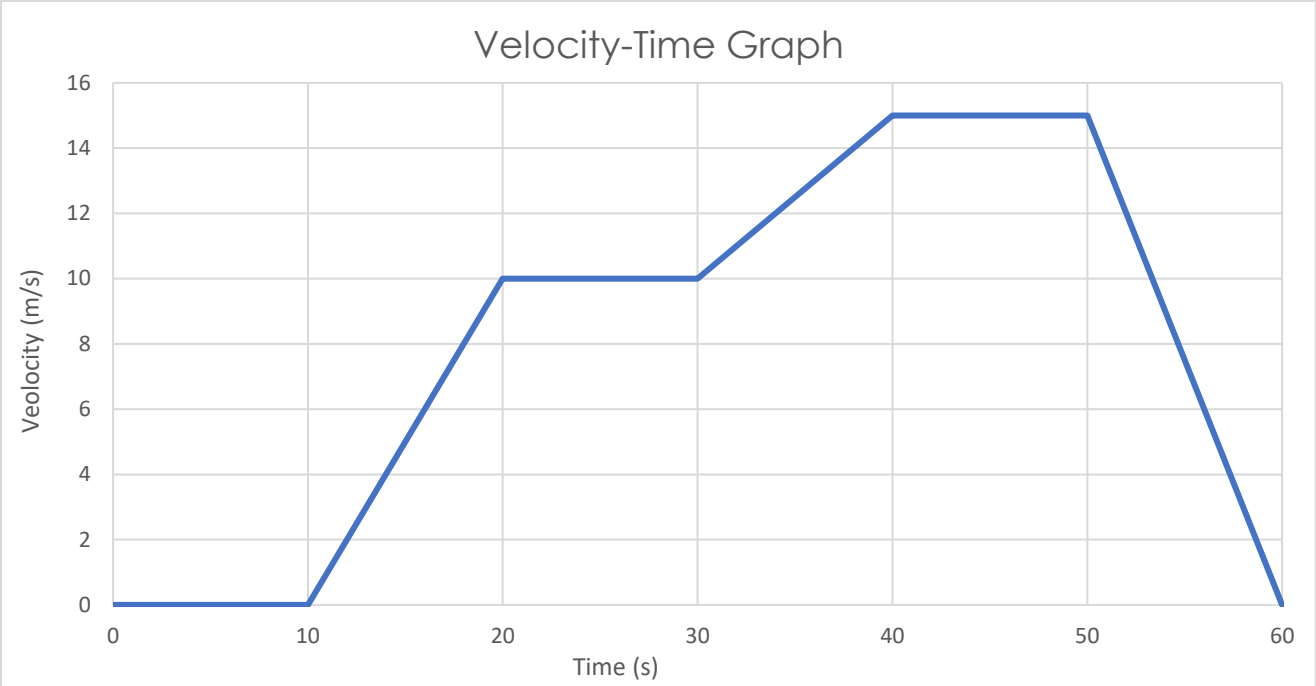
Tick (✓) **one** box.

A. The object will continue at the same speed in the same direction ☐

B. The object will slow down towards the left ☐

C. The object will move towards the right ☐

5. Use the velocity time graph below to answer questions 5(a) to 5(d).



(a) Choose the best description of the motion between 20 and 30 seconds. [1]

Tick (✓) **one** box.

A. The object is travelling slower than between 10 and 20 seconds ☐

B. The object is travelling at a constant speed ☐

C. The object is stationary ☐

(b) Choose the best description of the motion between 50 and 60 seconds. [1]

Tick (✓) **one** box.

A. The object is slowing down to a stop ☐

B. The object is returning to its original position ☐

C. The object is travelling faster than between 10 and 20 seconds ☐

(c) Choose what distance was covered by this object in the first 30 seconds. [1]

Tick (✓) **one** box.

A. 300 m ☐

B. 150 m ☐

C. 500 m ☐

(d) Choose the acceleration between 30 and 40 seconds. [1]

Tick (✓) **one** box.

A. 0.5 m/s^2 ☐

B. 0.5 m/s ☐

C. 2 m/s^2 ☐

D. 2 m/s ☐

6. The equation y = mx + c represents a linear relationship on a graph.

Choose what 'm' represents in this equation. [1]

Tick (✓) **one** box.

A. The gradient of the line ☐

B. Where the line intercepts the x axis ☐

C. Where the line intercepts the y axis ☐

7. A student investigated the time taken for two different balls to travel down a 5 m ramp.

A clock was used to measure the time.

The ramp was placed on a block so it was held at the same position.

The results are shown below and there is an anomaly circled.

	Time (seconds)		
Type of ball	**Reading 1**	**Reading 2**	**Reading 3**
Ping-pong ball	4	4	1
Tennis ball	2	2	2

Choose the most likely cause of this anomaly. [1]

Tick (✓) **one** box.

A. A clock doesn't allow measurement of time to 2 decimal places ☐

B. The student forgot to look at the clock so a shorter time was measured ☐

C. The ping-pong ball must have travelled faster on the third reading ☐

8. Choose which measurements are needed to calculate the acceleration of an object. [1]

Tick (✓) **one** box.

A. Final velocity of the object ☐

B. Initial velocity and final velocity of the object ☐

C. Initial velocity and final velocity of the object and the time taken for velocity to change ☐

9. Choose the correct way to calculate the gradient of a line. [1]

Tick (✓) **one** box.

A. Gradient = $\frac{Change\ in\ x}{Change\ in\ y}$ ☐

B. Gradient = $\frac{Change\ in\ y}{Change\ in\ x}$ ☐

C. Gradient = $\frac{Total\ x}{Total\ y}$ ☐

D. Gradient = $\frac{Total\ y}{Total\ x}$ ☐

10. Choose which pair of forces would create the largest resultant force. [1]

Tick (✓) **one** box.

A. Two forces acting at 90° to each other ☐

B. Two forces acting at 180° to each other ☐

C. Two forces acting at 0° to each other ☐

11. Choose the correct method for calculating the acceleration of a car that accelerates from being stationary to 50 m/s in 5 seconds. [1]

Tick (✓) **one** box.

A. $\frac{50 - 5}{5}$ ☐

B. $\frac{5 - 0}{50}$ ☐

C. $\frac{0 - 50}{5}$ ☐

D. $\frac{50 - 0}{5}$ ☐

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Section B

1. List three examples of **scalar quantities**.

   _____

2. Describe what is meant by the term **displacement**.

   _____

   _____

3. An object is moving in a circle at a constant speed.
   Explain why it is correct to say that this object is accelerating.

   _____

   _____

   _____

4. Sketch a velocity-time graph on the axes below using this information.
   (Scales are approximate in this diagram)

   - A car travelled at a constant acceleration for 10 seconds
   - Then the car remained at a constant speed for 10 seconds
   - Then the car travelled at a constant deceleration for 20 seconds