

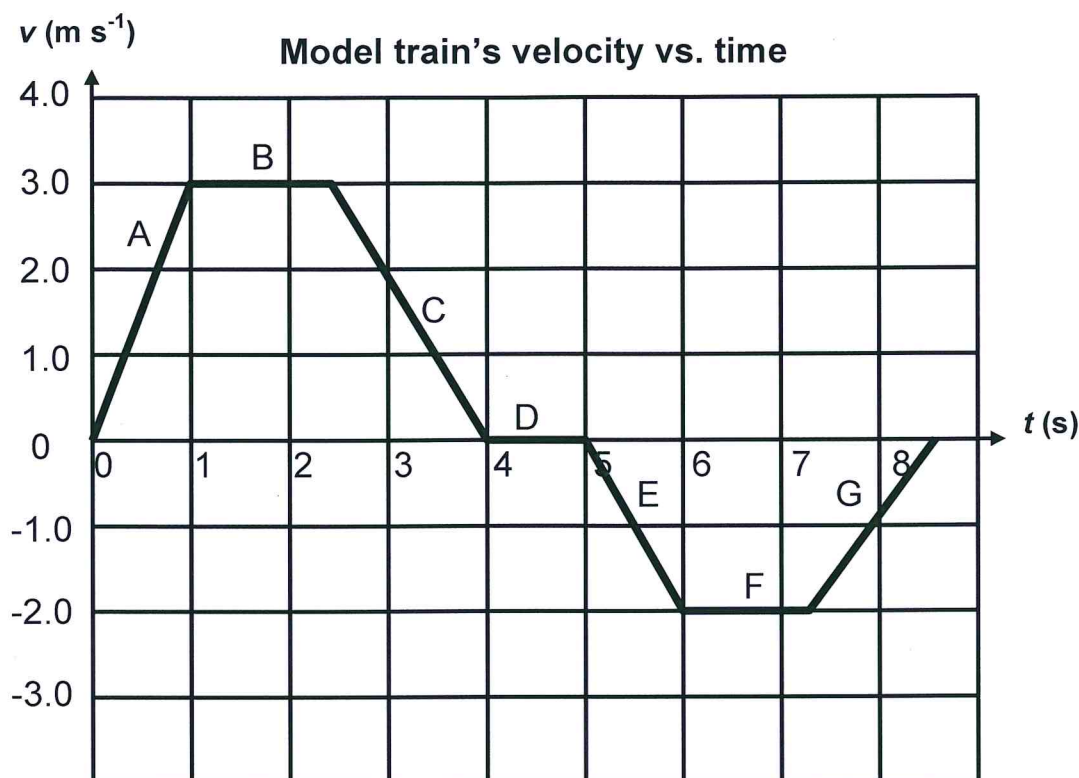
# Chapter 7.1 Exam Q

## Question 1

page 1

(3 marks)

A model electric train's velocity is graphed as it moves along a section of straight track.



- (a) During which section of the graph is the acceleration the greatest? (1 mark)

Circle the correct answer:      A      B      C      D      E      F      G

- (b) During which section is the train not moving? (1 mark)

Circle the correct answer:      A      B      C      D      E      F      G

- (c) At the end of the journey, the train's displacement relative to its starting position will be: (1 mark)

Circle the correct answer:      Positive      Zero      Negative

## Question 2

(3 marks)

A sprinter completes one lap of an oval 400 m track in 55.0 s, finishing at the same point he started.

- (a) Determine the speed of the sprinter. (2 marks)
- (b) Determine the velocity of the sprinter. (1 mark)

# Chapter 7.1

## Question 3

## Exam Q

page 2

(4 marks)

A farmer walked 745 m west from a gate to repair a fence post. When that job was finished he turned around and walked 984 m east to repair another part of the fence. Draw and label a vector diagram of his total journey then calculate his resultant displacement.

## Question 4

(5 marks)

An aircraft attempts to land along a north-south aligned landing strip. It approaches from the south and has an air speed of  $133 \text{ km hr}^{-1}$ . The wind is blowing from the west at  $45.0 \text{ km hr}^{-1}$ . Draw a vector diagram to show the direction the aircraft needs to head and calculate its actual velocity, in  $\text{m s}^{-1}$ , relative to the runway. Show **all** workings.

## Question 5

(3 marks)

A hiker is walking east across a flat desert. After walking for 945 m, he realises he has dropped his water bottle and walks back 570 m to get it. Draw and label a vector diagram showing his path and calculate his resultant displacement.

## Question 6

(10 marks)

The *Hydroptere*, an experimental hydrofoil super yacht, is one of the fastest yachts to sail the ocean. When it reaches a speed of about 15 knots it starts to rise up out of the water; until at 20 knots only about  $2.5 \text{ m}^2$  of the yacht is in contact with the water. From this speed, with the appropriate wind conditions, the *Hydroptere* can accelerate rapidly to about 45 knots, appearing to be almost flying over the water.

- (a) Given that 1 knot equals  $0.5144 \text{ m s}^{-1}$ , complete the third column of the table below to three significant figures. (2 marks)

Time (s)	Speed in knots	Speed in $\text{m s}^{-1}$
0	20.0	10.3
2.00	25.9	13.3
4.00	30.7	
5.00	31.9	
8.00	40.4	20.8
10.0	45.0	23.1

- (b) Using the grid on page 29, plot a graph of speed (in  $\text{m s}^{-1}$ ) against time and draw a straight line of best fit. (4 marks)
- (c) Calculate the gradient of the line of best fit, including the correct units. Show **all** workings. (4 marks)