Kinematics - Velocity and Displacement Time Graphs Exam Questions (from OCR MEI 4761)

Q1, (Jan 2006, Q1)

A particle travels in a straight line during the time interval $0 \leqslant t \leqslant 12$, where t is the time in seconds. Fig. 1 is the velocity-time graph for the motion.

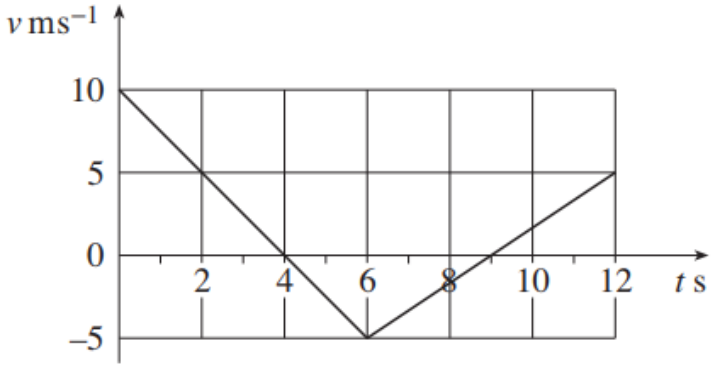

Fig. 1

(i) Calculate the acceleration of the particle in the interval $0 < t < 6$. [2]

(ii) Calculate the distance travelled by the particle from $t = 0$ to $t = 4$. [2]

(iii) When $t = 0$ the particle is at A. Calculate how close the particle gets to A during the interval $4 \leqslant t \leqslant 12$. [2]

Q2, (Jan 2007, Q1)

Fig. 1 is the velocity-time graph for the motion of a body. The velocity of the body is v m s^{-1} at time t seconds.

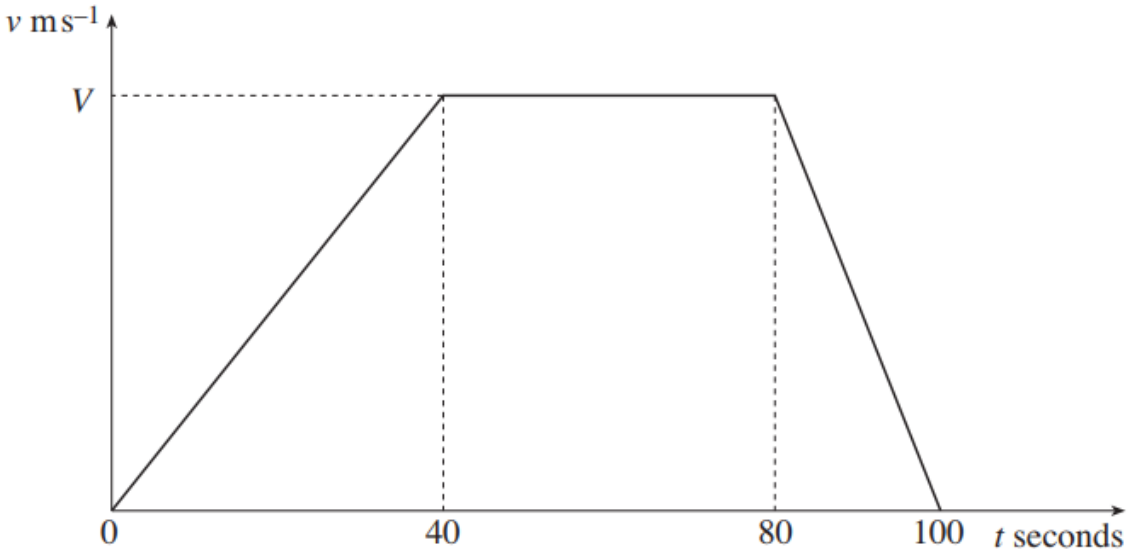

Fig. 1

The displacement of the body from $t = 0$ to $t = 100$ is 1400 m. Find the value of V. [4]

Q3, (Jun 2012, Q1)

Fig. 1 shows the speed-time graph of a runner during part of his training.

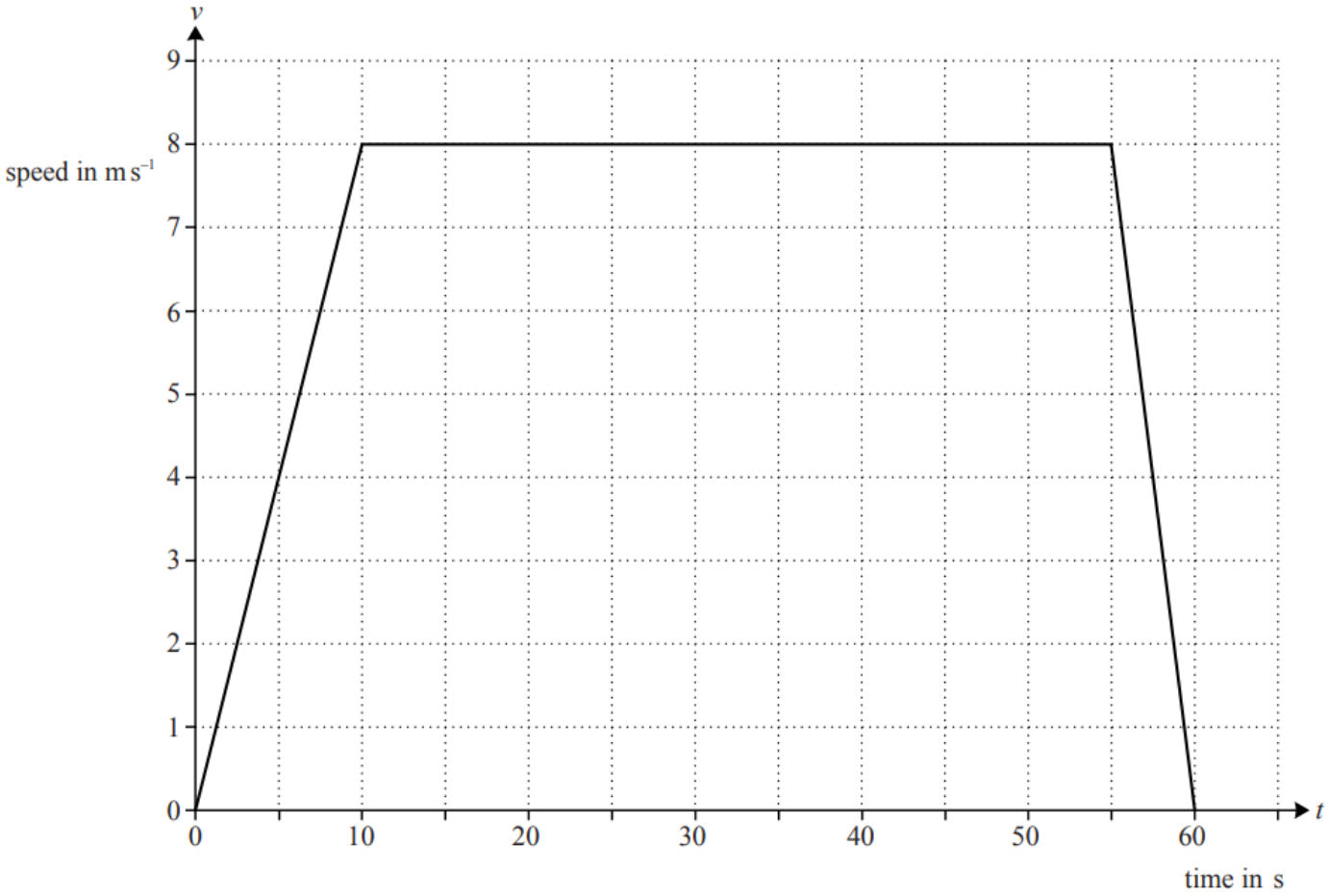

Fig. 1

For each of the following statements, say whether it is true or false. If it is false give a brief explanation.

(*A*) The graph shows that the runner finishes where he started.

(*B*) The runner's maximum speed is $8\,\text{m s}^{-1}$.

(*C*) At time 58 seconds, the runner is slowing down at a rate of $1.6\,\text{m s}^{-2}$.

(*D*) The runner travels 400 m altogether. **[6]**

Q4, (Jun 2009, Q1)

The velocity-time graph shown in Fig. 1 represents the straight line motion of a toy car. All the lines on the graph are straight.

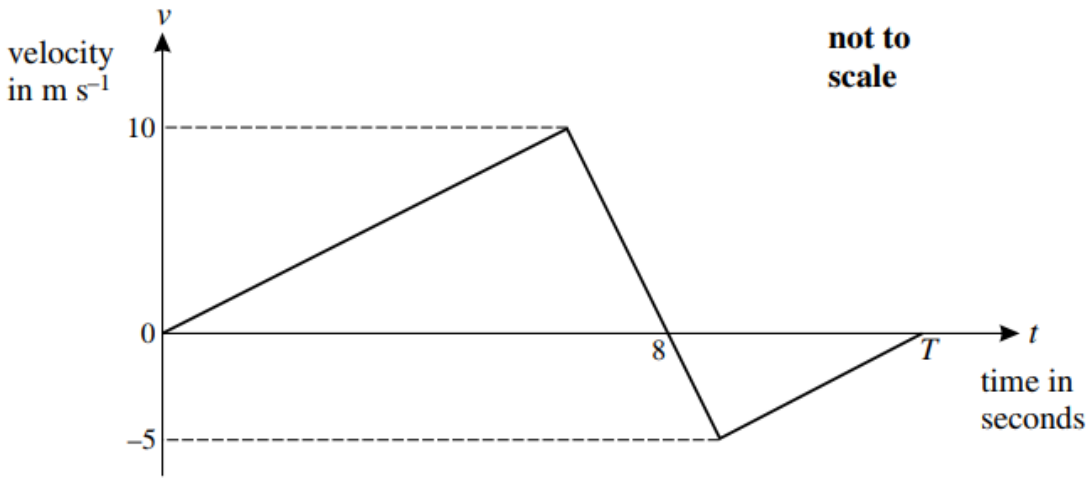

Fig. 1

The car starts at the point A at $t = 0$ and in the next 8 seconds moves to a point B.

(i) Find the distance from A to B. **[2]**

T seconds after leaving A, the car is at a point C which is a distance of 10 m from B.

(ii) Find the value of T. **[3]**

(iii) Find the displacement from A to C. **[1]**

Q5, (Jan 2010, Q1)

A ring is moving up and down a vertical pole. The displacement, s m, of the ring above a mark on the pole is modelled by the displacement-time graph shown in Fig. 1. The three sections of the graph are straight lines.

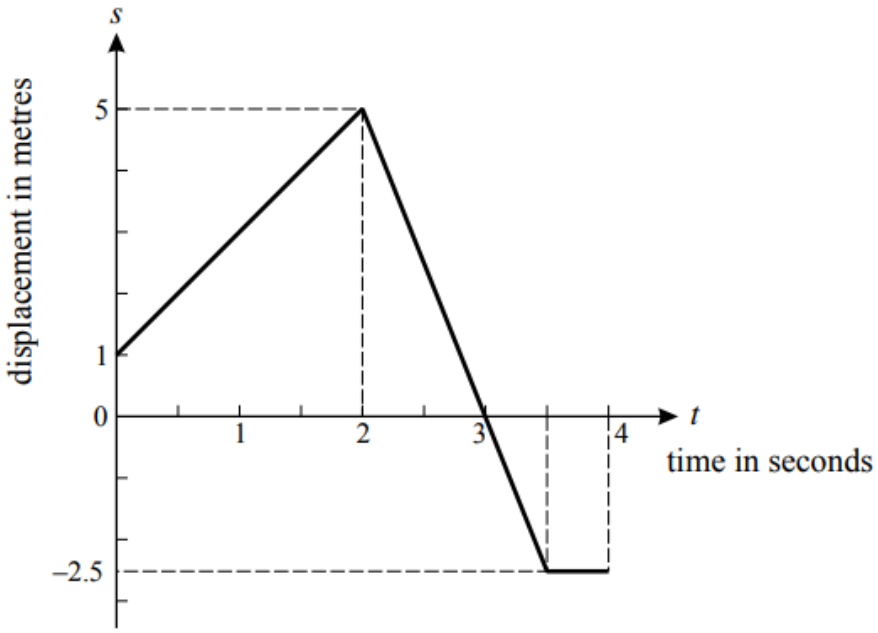

Fig. 1

(i) Calculate the velocity of the ring in the interval $0 < t < 2$ and in the interval $2 < t < 3.5$. **[2]**

(ii) Sketch a velocity-time graph for the motion of the ring during the 4 seconds. **[2]**

(iii) State the direction of motion of the ring when

(*A*) $t = 1$,

(*B*) $t = 2.75$,

(*C*) $t = 3.25$. **[1]**