Your Science Online

Cambridge IGCSE Physics 0625 style

SPEED AND VELOCITY

Topic practice paper (exam style)

CANDIDATE NAME	
CLASS	
DATE	

45 minutes

You will need: a pen, a pencil, a ruler and a calculator.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes or in the margins.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 45.
- The number of marks for each question or part question is shown in brackets [ ].
- Questions or parts marked **[Extended]** are for Extended-tier candidates. Core candidates may leave them out (Core total: 26 marks).
- Topics: speed and average speed, velocity, distance–time and speed–time graphs, acceleration, free fall and terminal velocity.

For teacher's use	
Question	**Mark**
1	
2	
3	
4	
5	
6	
Total	

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1 A cyclist rides 3.6 km along a straight road. The ride takes 12 minutes.

(a) State the equation that links average speed, distance travelled and time taken.

..... [1]

(b) Calculate the average speed of the cyclist in m/s.

.....

.....

.....

average speed = ... m/s [3]

(c) Convert your answer to (b) into km/h.

.....

speed = ... km/h [1]

(d) Explain the difference between *speed* and *velocity*.

.....

..... [1]

(e) A student measures the time for a toy car to travel 1.0 m using a stopwatch. Suggest why she should repeat the timing several times and calculate an average.

.....

..... [1]

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2 A student walks from home to a shop. Fig. 2.1 shows the distance–time graph for the first 60 s of her journey.

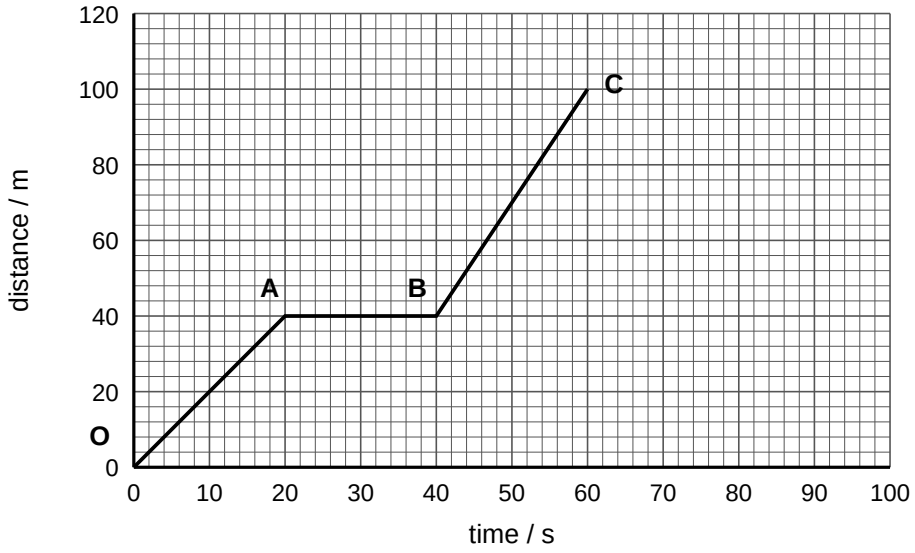

Fig. 2.1

(a) Describe the motion of the student between A and B.

.....

[1]

(b) Calculate her speed between O and A.

.....

.....

speed = ... m/s [2]

(c) State the section of the graph, OA, AB or BC, where she moves fastest. Explain how the graph shows this.

.....

.....

[2]

(d) Calculate her average speed for the first 60 s.

.....

.....

average speed = ... m/s [2]

(e) She then waits at a crossing for 20 s. On Fig. 2.1, draw the graph for this part of the journey.

[1]

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3 Fig. 3.1 shows the speed–time graph for a car travelling between two sets of traffic lights.

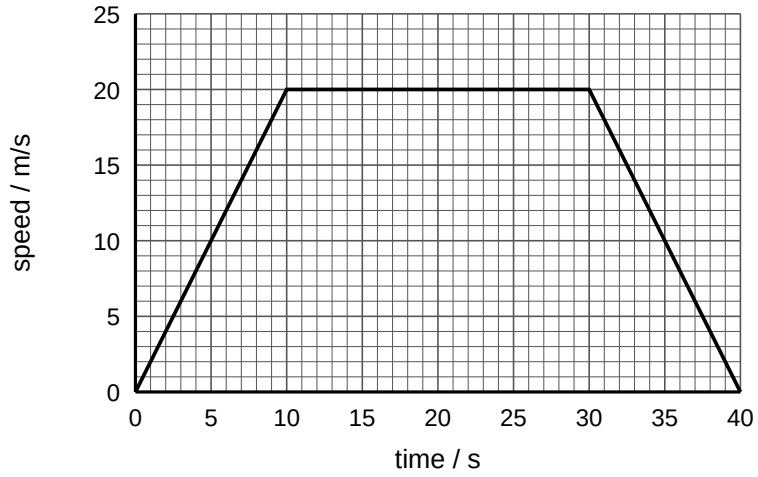

Fig. 3.1

(a) ***[Extended]*** State what the gradient of a speed–time graph represents.

.....

[1]

(b) ***[Extended]*** Calculate the acceleration of the car between 0 and 10 s. Give the unit.

.....

.....

acceleration = ... [2]

(c) Describe the motion of the car between 30 s and 40 s.

.....

[1]

(d) Use Fig. 3.1 to calculate the total distance travelled by the car in 40 s.

.....

.....

.....

distance = ... m [3]

(e) Calculate the average speed of the car for the 40 s.

.....

average speed = ... m/s [2]

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4 ***[Extended]*** A skydiver jumps from a helicopter that is not moving. Fig. 4.1 shows how her speed changes before she opens her parachute.

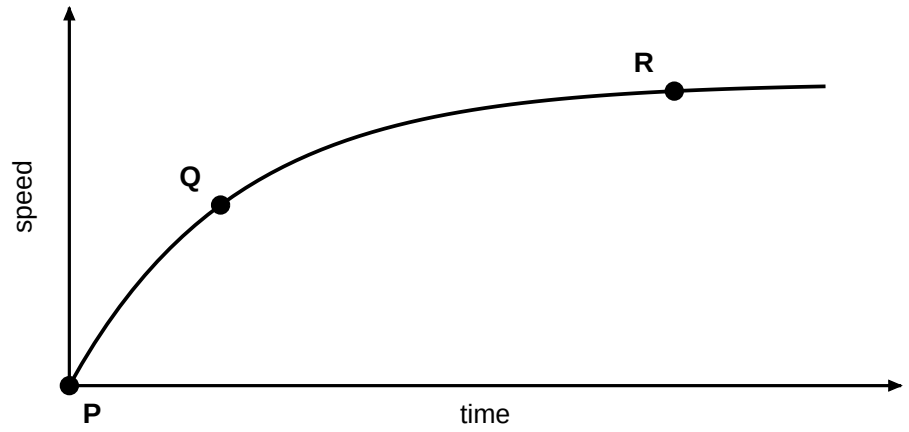

Fig. 4.1

(a) State the acceleration of the skydiver at point P. Give the unit.

..... [1]

(b) Explain, in terms of the forces on the skydiver, why her acceleration decreases between P and R.

.....

.....

..... [3]

(c) State the resultant force on the skydiver at R. State the name given to her speed at R.

.....

..... [1]

(d) The skydiver opens her parachute. Describe and explain how her speed changes until she reaches a new constant speed.

.....

.....

.....

..... [3]

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5 ***[Extended]*** A train is travelling at 30 m/s. The driver applies the brakes and the train slows down steadily to 12 m/s in 45 s.

(a) Calculate the deceleration of the train in m/s^2.

.....

.....

deceleration = ... [2]

(b) Calculate the distance travelled by the train while it slows down.

.....

.....

distance = ... m [2]

(c) Later, the train travels around a curved track at a constant speed of 20 m/s. A passenger says, “The velocity of the train is constant.” Explain whether the passenger is correct.

.....

..... [2]

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6 A student drops a heavy metal ball. A light gate and data logger measure its speed at different times. Table 6.1 shows the results.

time / s	0	0.10	0.20	0.30	0.40	0.50
speed / m/s	0	1.0	1.9	3.0	3.9	4.9

Table 6.1

(a) On the grid in Fig. 6.1, plot a speed–time graph of the results. Draw the best-fit line.

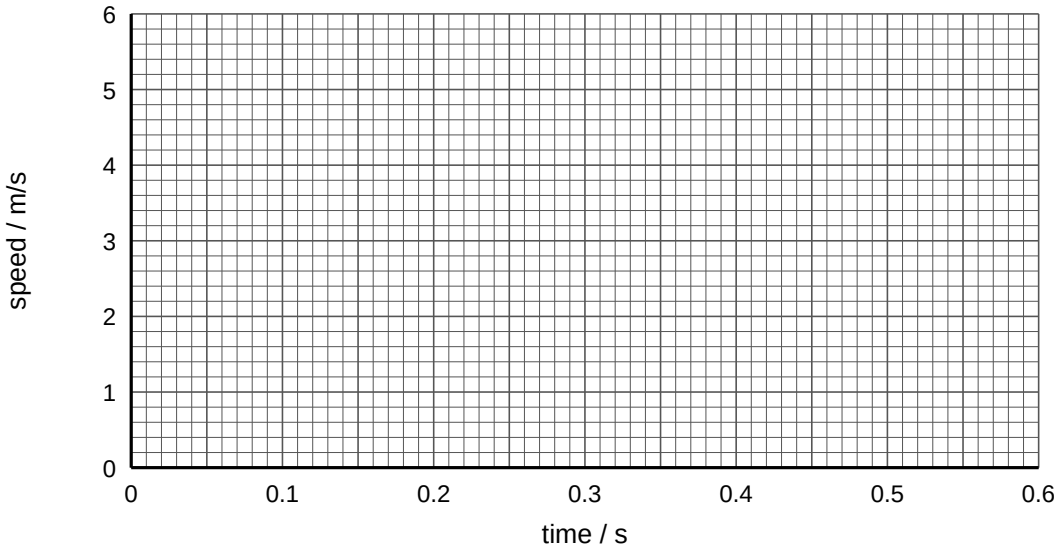

Fig. 6.1

[3]

(b) ***[Extended]*** Use the gradient of your graph to determine the acceleration of the ball in m/s^2.

.....

.....

acceleration = ... [2]

(c) State the name of the acceleration of an object that falls freely near the Earth's surface.

..... [1]

(d) The student repeats the experiment with a table-tennis ball. Suggest why its acceleration is smaller.

.....

..... [1]

END OF PAPER

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