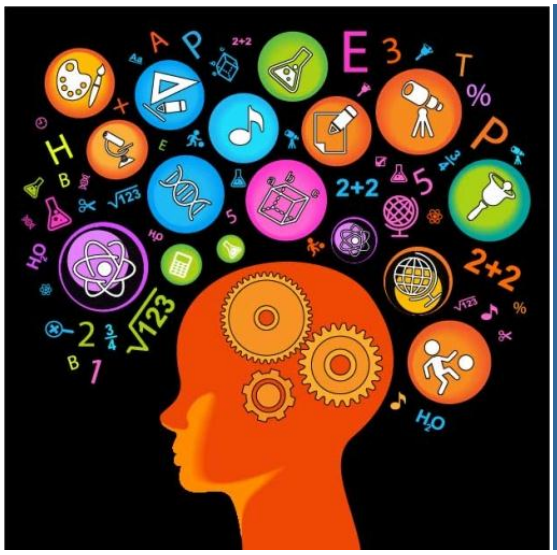
PHYSICS 2

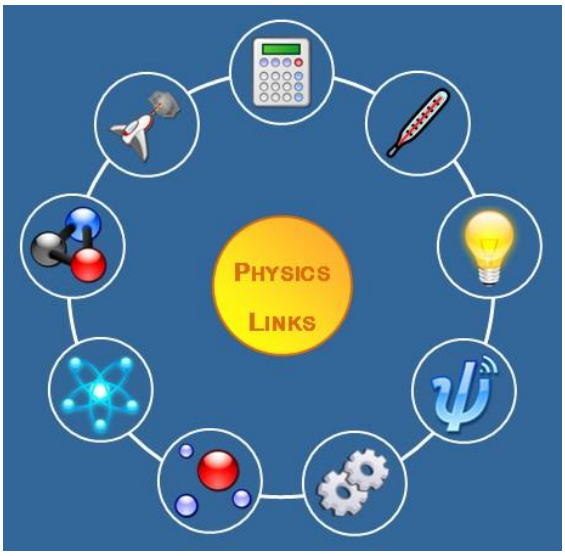
PHYSICS

GRADE 10

TERM 2 PORTFOLIO TASKS 1 AND 2

2013-2014



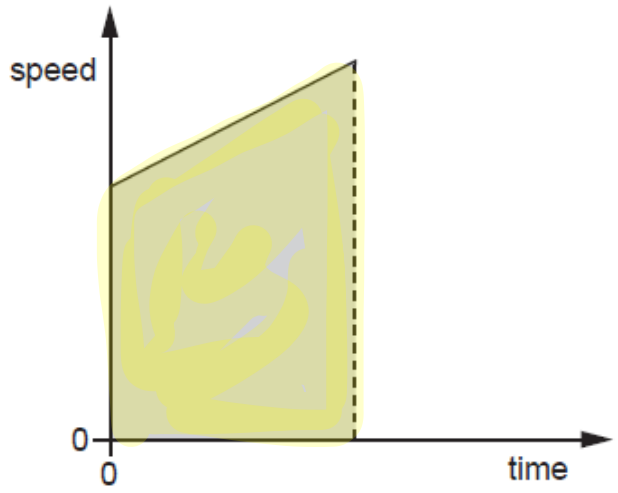


Unit/Topic	Performance Criteria	Assess Event	Date	Time
		Portfolio Tasks 1,2	Term 2	
Student Name	**Teacher**	**Class**	**Total Mark**	
	Ayman Al Omari			
Marked and feedback provided by:		**Signature:**	**Date:**	
Teacher Comment:				
Feedback acknowledgement	I certify that the work submitted is my own. I acknowledge that I have received and understood feedback about this assignment.			
Student Comment:				
Student Signature:		**Date:**		

Multiple choice

1

The diagram shows a speed-time graph for a body moving with constant acceleration.



What is represented by the shaded area under the graph?

A acceleration

B distance

C speed

D time

$d = v \times t$

2

A tunnel has a length of 50 km. A car takes 20 min to travel between the two ends of the tunnel.

What is the average speed of the car?

A 2.5 km / h

B 16.6 km / h

C 150 km / h

D 1000 km / h

$v = \frac{d}{t}$ | $t = 20$ min $= \frac{20}{60} = 0.33$ h

$= \frac{50}{0.33}$

$= 150$ km/h

3

Which statement is correct?

A Mass is a force, measured in kilograms.

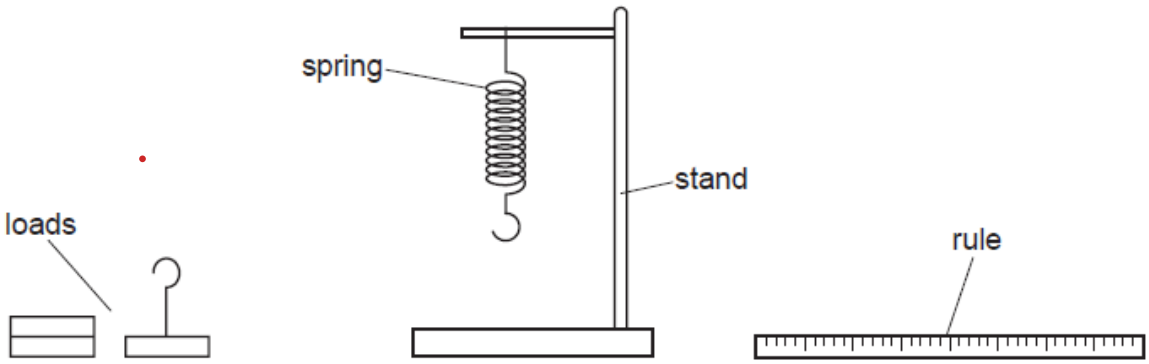
B Mass is a force, measured in newtons.

C Weight is a force, measured in kilograms.

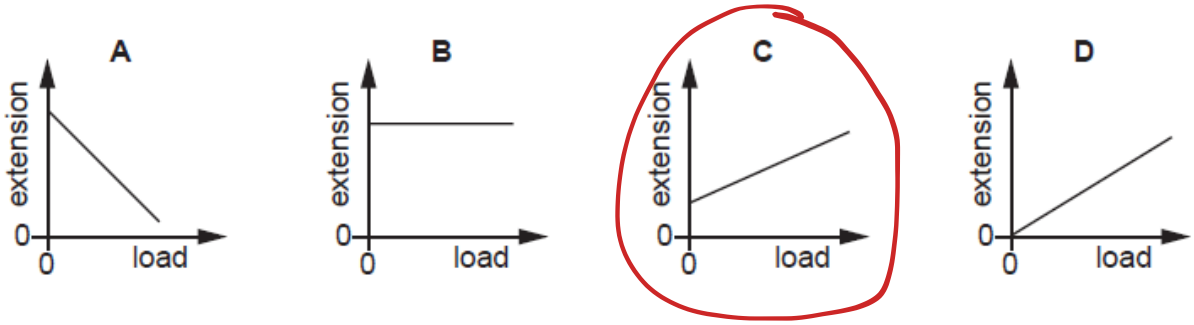
D Weight is a force, measured in newtons.

4

A spring is suspended from a stand. Loads are added and the extensions are measured.

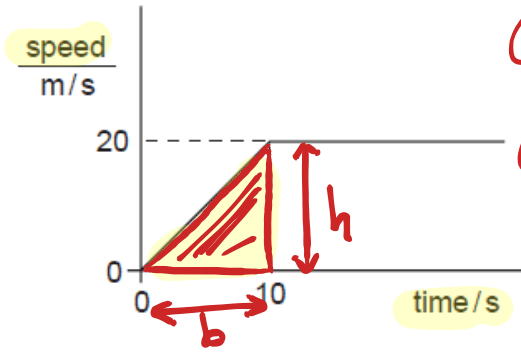


Which graph shows the result of plotting extension against load?



5

A car accelerates from traffic lights. The graph shows how the car's speed changes with time.



How far does the car travel before it reaches a steady speed?

A 10 m **B** 20 m **C** 100 m **D** 200 m

6

Which statement is correct?

A The mass of a bottle of water at the North Pole is different from its mass at the Equator.

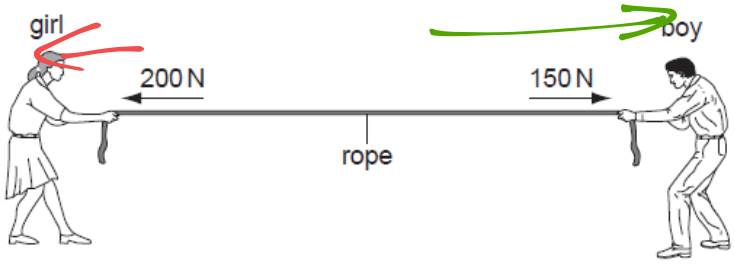
B The mass of a bottle of water is measured in newtons.

C The weight of a bottle of water and its mass are the same thing.

D The weight of a bottle of water is one of the forces acting on it.

7

A girl and a boy are pulling in opposite directions on a rope. The forces acting on the rope are shown in the diagram.



Which single force has the same effect as the two forces shown?

A 50 N acting towards the girl

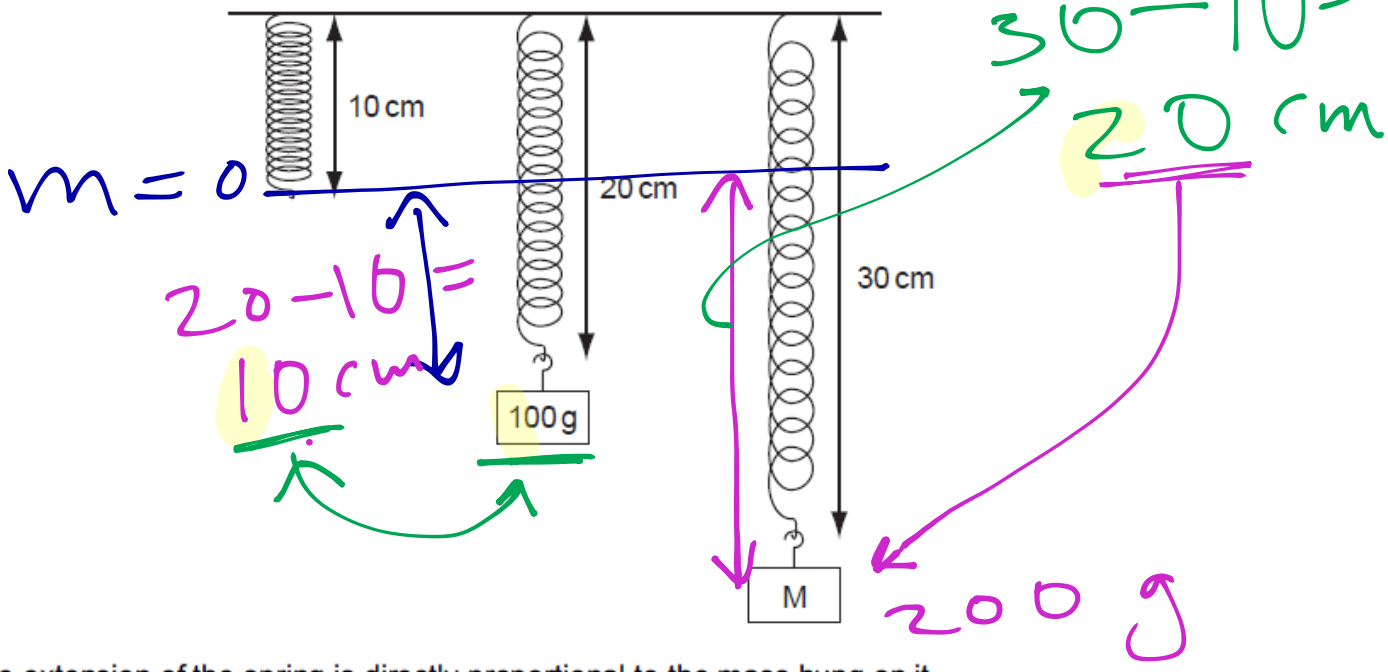
B 350 N acting towards the girl

C 50 N acting towards the boy

D 350 N acting towards the boy

8

Objects with different masses are hung on a 10 cm spring. The diagram shows how much the spring stretches.



The extension of the spring is directly proportional to the mass hung on it.

What is the mass of object M?

A 110 g **B** 150 g **C** 200 g **D** 300 g

9

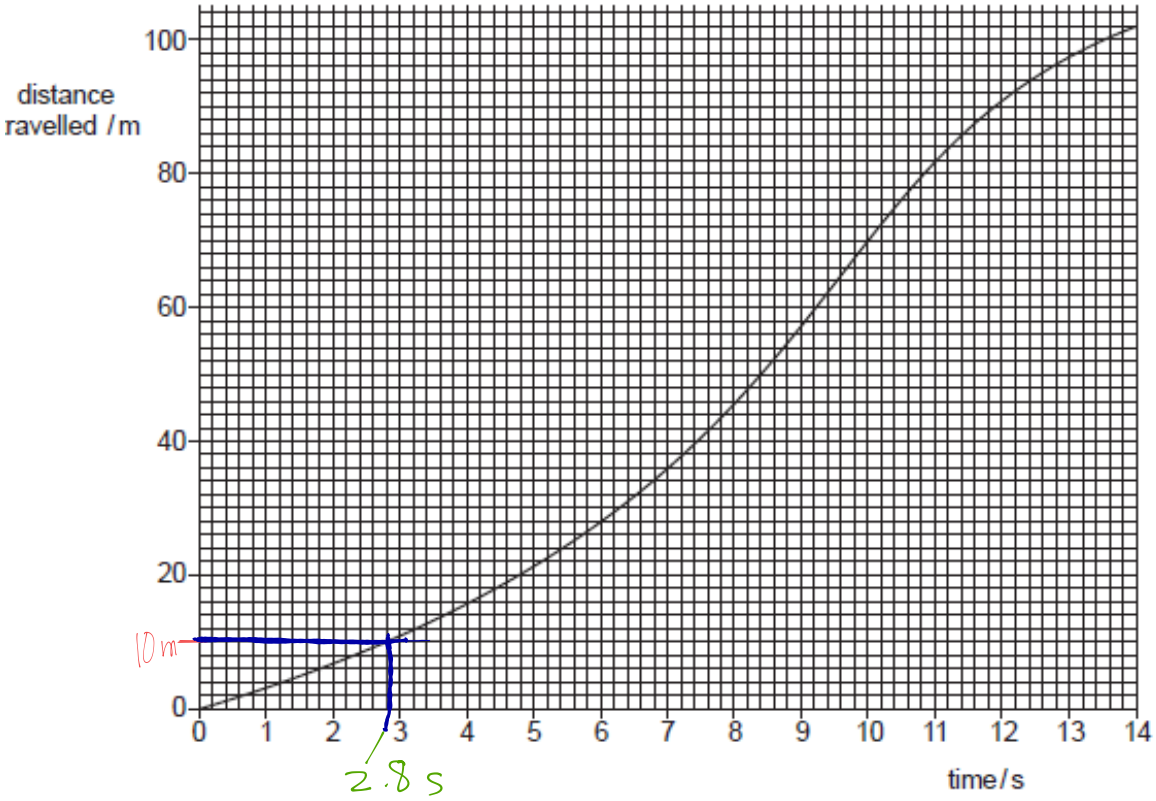
Two stones of different weight fall at the same time from a table. Air resistance may be ignored.

What will happen and why?

	what will happen	why
A	both stones hit the floor at the same time	the acceleration of free fall is constant
B	both stones hit the floor at the same time	they fall at constant speed
C	the heavier stone hits the floor first	acceleration increases with weight
D	the heavier stone hits the floor first	speed increases with weight

10

The graph shows the progress of an athlete in a 100 m race.



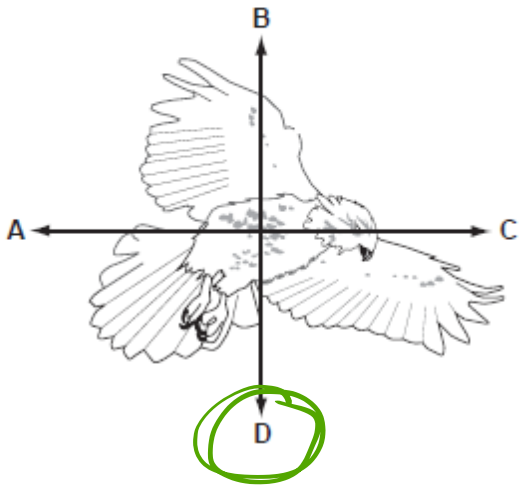
What time was taken to travel 10m from the start?

A 2.4s **B** 2.8s **C** 65s **D** 70s

11

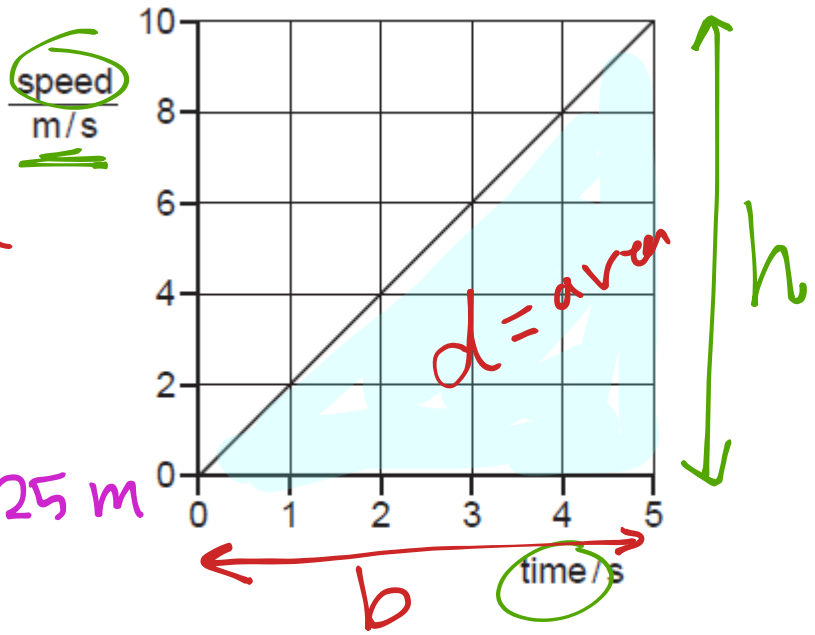
The diagram shows a bird in flight.

In which direction does the weight of the bird act?



12

The graph represents the movement of a body.



d = area

$d = \frac{bh}{2}$

$d = \frac{5 \times 10}{2} = \frac{50}{2} = 25\ m$

How far has the body moved after 5 s?

A 2 m **B** 10 m **C** 25 m **D** 50 m

13

Which statement about the masses and weights of objects on the Earth is correct?

A A balance can only be used to compare weights, not masses.

B Heavy objects always have more mass than light ones.

C Large objects always have more mass than small ones.

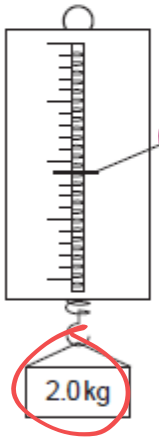
D Mass is a force but weight is not.

14

The table shows the weight in newtons of a 10 kg mass on each of four planets.

planet	weight of a 10 kg mass / N
Earth	100
Jupiter	250
Mercury	40
Venus	90

The diagram shows a force meter (spring balance) being used.



On which planet is the force meter (spring balance) being used?

A Earth

B Jupiter

C Mercury

D Venus

15

Which property of an object **cannot** be changed by a force?

A its mass

B its motion

C its shape

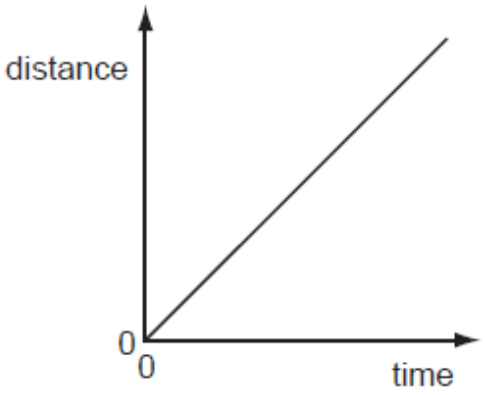
D its size

16

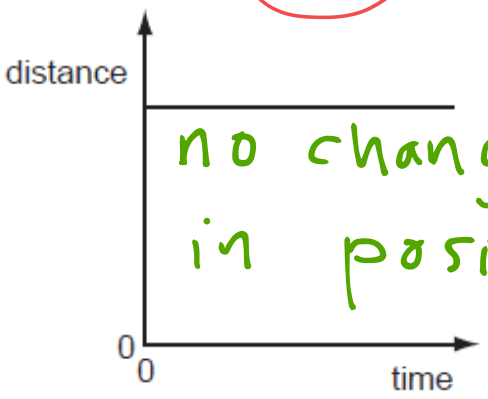
Two distance/time graphs and two speed/time graphs are shown.

Which graph represents an object that is at rest?

A

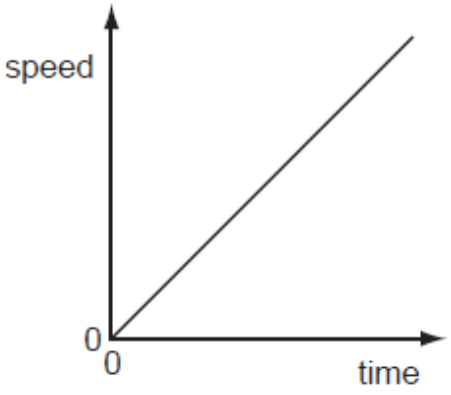


B

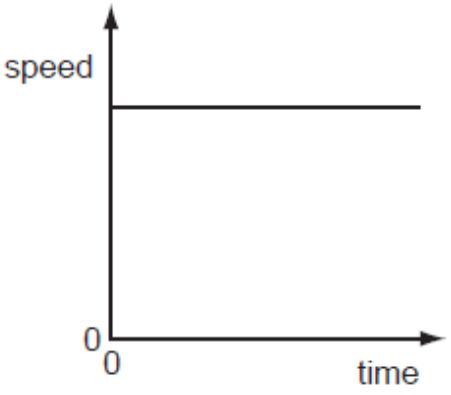


no change in position

C

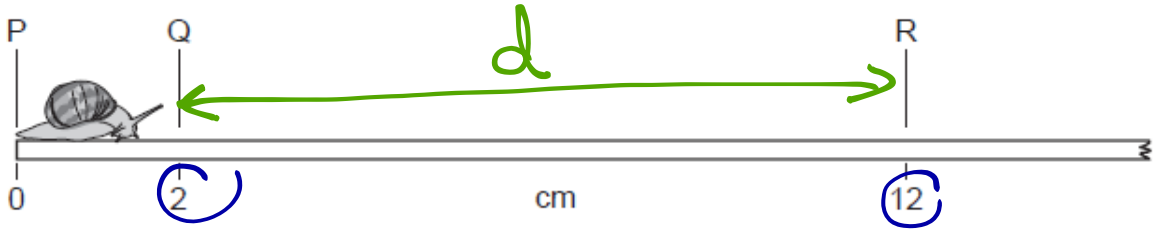


D



17

A snail moves along a ruler. It takes 20 s to move from Q to R.



What is its average speed from Q to R?

A $\frac{12}{20}$ cm/s

B $\frac{12-2}{20}$ cm/s

C $\frac{20}{12}$ cm/s

D $\frac{20}{12-2}$ cm/s

18

An experiment is carried out to measure the extension of a rubber band for different loads.

The results are shown below.

load/N	0	1	2	3
length/cm	15.2	16.2	17.3	18.6
extension/cm	0	1.0	2.1	3.4

Which figure is missing from the table?

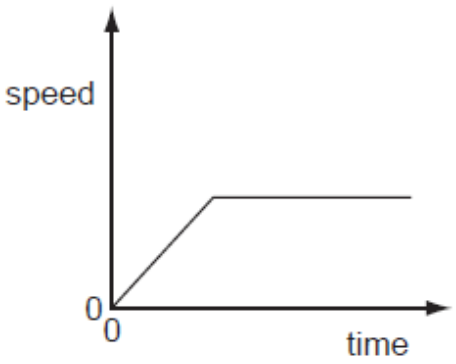
A 17.2 **B** 17.3 **C** 17.4 **D** 17.6

19

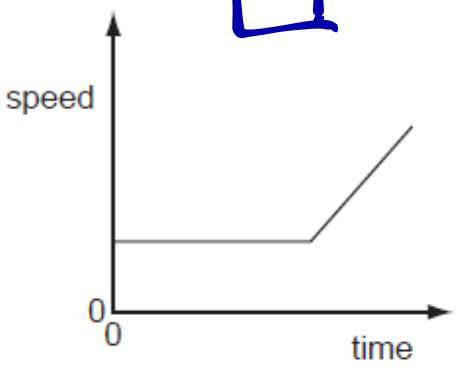
An object moves initially with constant speed and then with constant acceleration.

Which graph shows this motion?

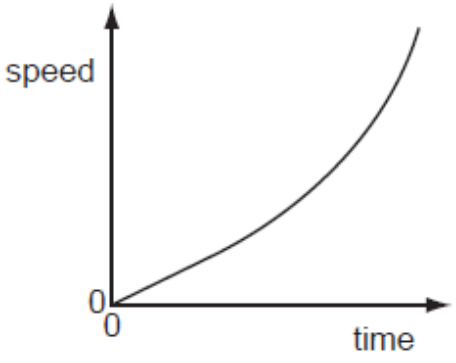
A



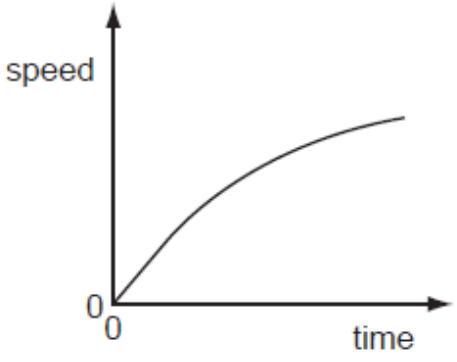
B



C

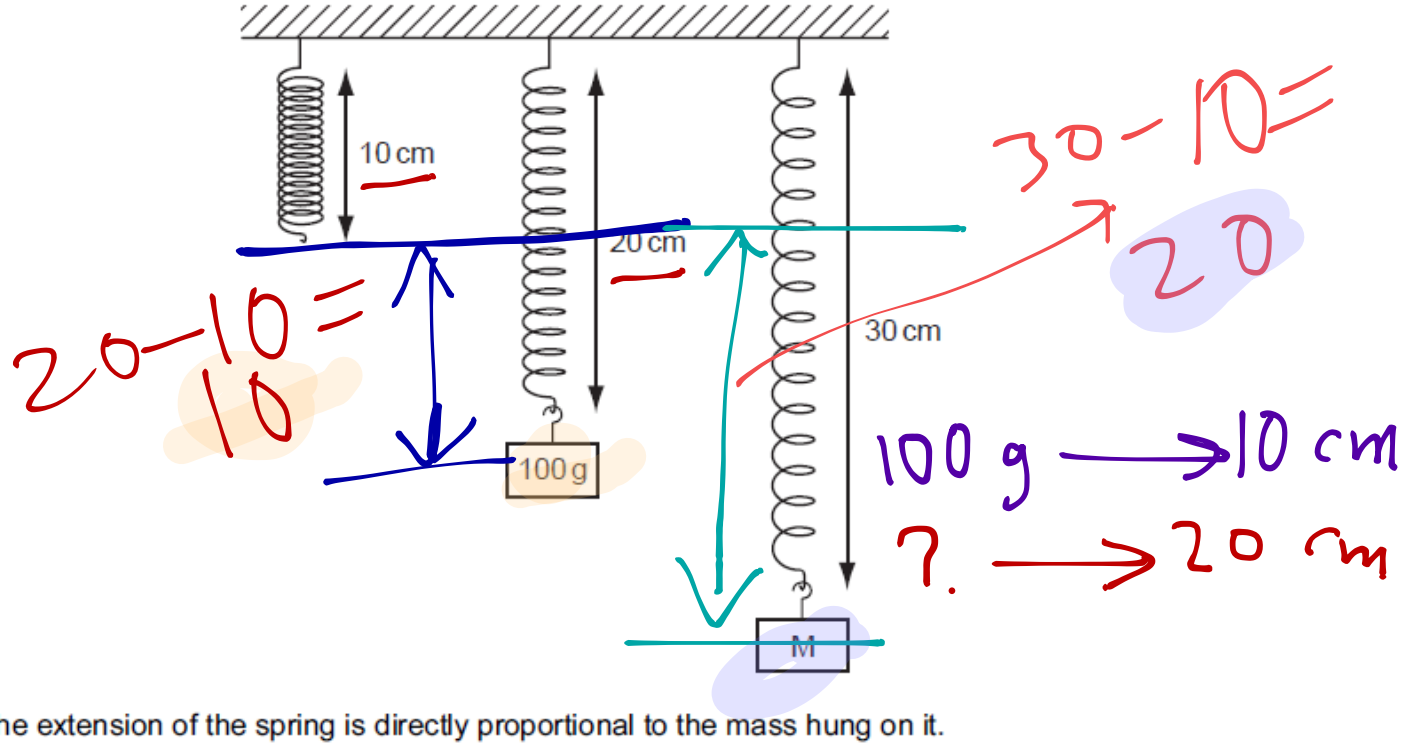


D



10 cm--- 100 g
20 cm--- ?
.= 200 g

Objects with different masses are hung on a spring. The diagram shows how much the spring stretches.



The extension of the spring is directly proportional to the mass hung on it.

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Theory questions

1

In a training session, a racing cyclist's journey is in three stages.

Stage 1 He accelerates uniformly from rest to 12 m/s in 20 s.

Stage 2 He cycles at 12 m/s for a distance of 4800 m.

Stage 3 He decelerates uniformly to rest.

The whole journey takes 500 s.

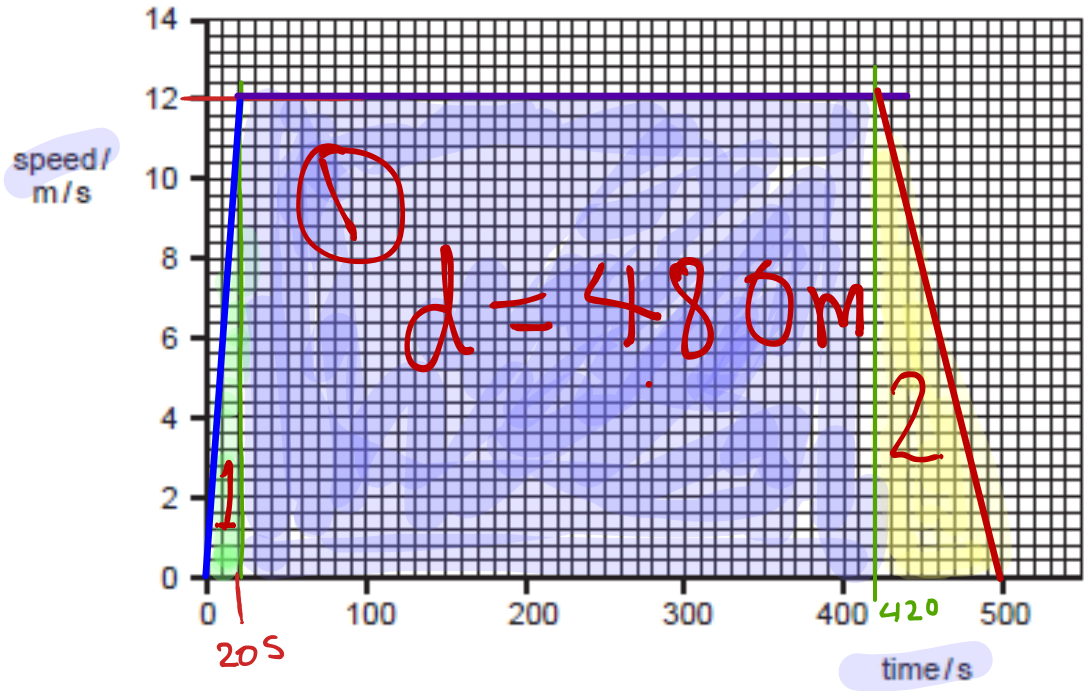
(a) Calculate the time taken for stage 2.

$t = \frac{d}{v}$

$= \frac{4800}{12} = 400\ s$

time = 400 s [2]

(b) On the grid of Fig. 2.1, draw a speed/time graph of the cyclist's ride. [3]



(c) Show that the total distance travelled by the cyclist is 5400m.

$d_1 = \text{area}(1) = \frac{bh}{2} = \frac{20 \times 12}{2} = 120\ m$

$d_2 = 4800\ m$ Given

$d_3 = \text{area}(3) = \frac{bh}{2} = \frac{80 \times 12}{2} = 480\ m$

$d = d_1 + d_2 + d_3 = 120 + 4800 + 480$

$= 5400\ m$ [4]

(d) Calculate the average speed of the cyclist.

$v = \frac{d}{t} = \frac{5400}{500} = 10.8\ m/s$

average speed = 10.8 m/s [2]

[Total: 11]

2

A boat sails along a river, stopping at various places along the way. Fig. 2.1 shows how the speed of the boat changes during the day, starting at 0900 hrs and reaching its final destination at 2100 hrs.

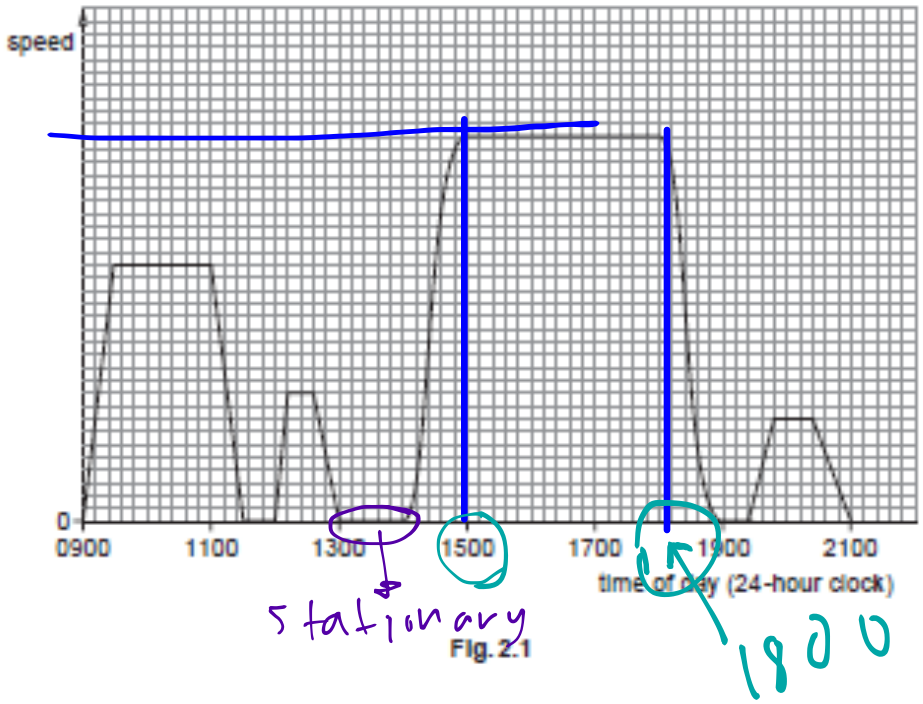


Fig. 2.1

(a) Calculate how long the whole journey takes.

2100 − 0900 = 12:00

time taken = ... 12 ..... hours [2]

(b) State the time of day at which the boat reaches its greatest speed.

rest

time of day = 15:00 − 18:00 [1]

(c) State the longest time for which the boat was stationary at one place.

longest time = ... 1 ..... hours [1]

(d) If the speed axis had values marked on it, state

(i) how the graph could be used to find the distance travelled between 0900 hrs and 1130 hrs,

.....

.....

(ii) how the average speed for the whole journey could be found.

.....

.....

[3]

3

The car in Fig. 3.1 is on a level road.

Fig. 3.1

(a) Calculate the magnitude of the resultant force on the car.

2000-500 = 1500 N

Forward resultant force = 1500 N [1]

(b) Tick the box below that describes the motion of the car.

سرعة ثابتة

travels forward at constant speed ☒

سرعة متزايدة

travels forward with increasing speed ☑

سرعة متناقصة

travels forward with decreasing speed ☒

travels backward at constant speed ☒

travels backward with increasing speed ☒

travels backward with decreasing speed ☒

ساكنا يبقى

remains at rest ☒

[1]

(c) The frictional forces increase to 2000 N when the car is moving. What happens to the car?

2000-2000 = 0. It travels with costant speed [1]

(d) Suggest two things that might have caused the frictional forces in (c) to increase.

1. Air resistance increases

2. road surface friction increases [2]

[Total: 5]

4

A car is travelling along a level road at a steady speed. Fig. 1.1 shows the speedometer in the car. A speedometer registers how fast the car is going.

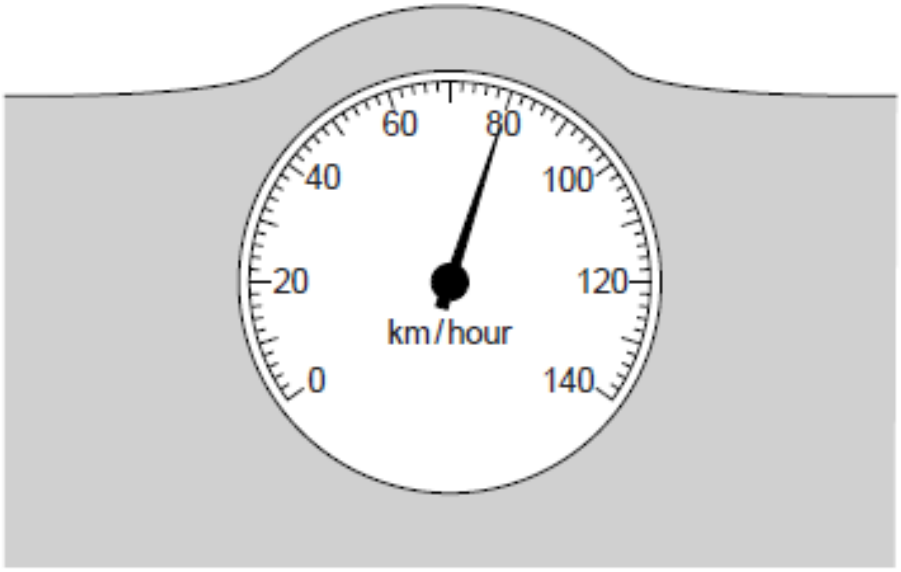


Fig. 1.1

(a) How far, in km, does the car travel in ½ hour at the speed shown in Fig. 1.1?

$d = v \times t$

$= 80 \times 0.5 = 40$ km

distance = 40 km [3]

V

(b) (i) On the axes shown in Fig. 1.2, draw a line representing the motion of the car for the ½ hour mentioned in (a). Do not go beyond ½ hour. [3]

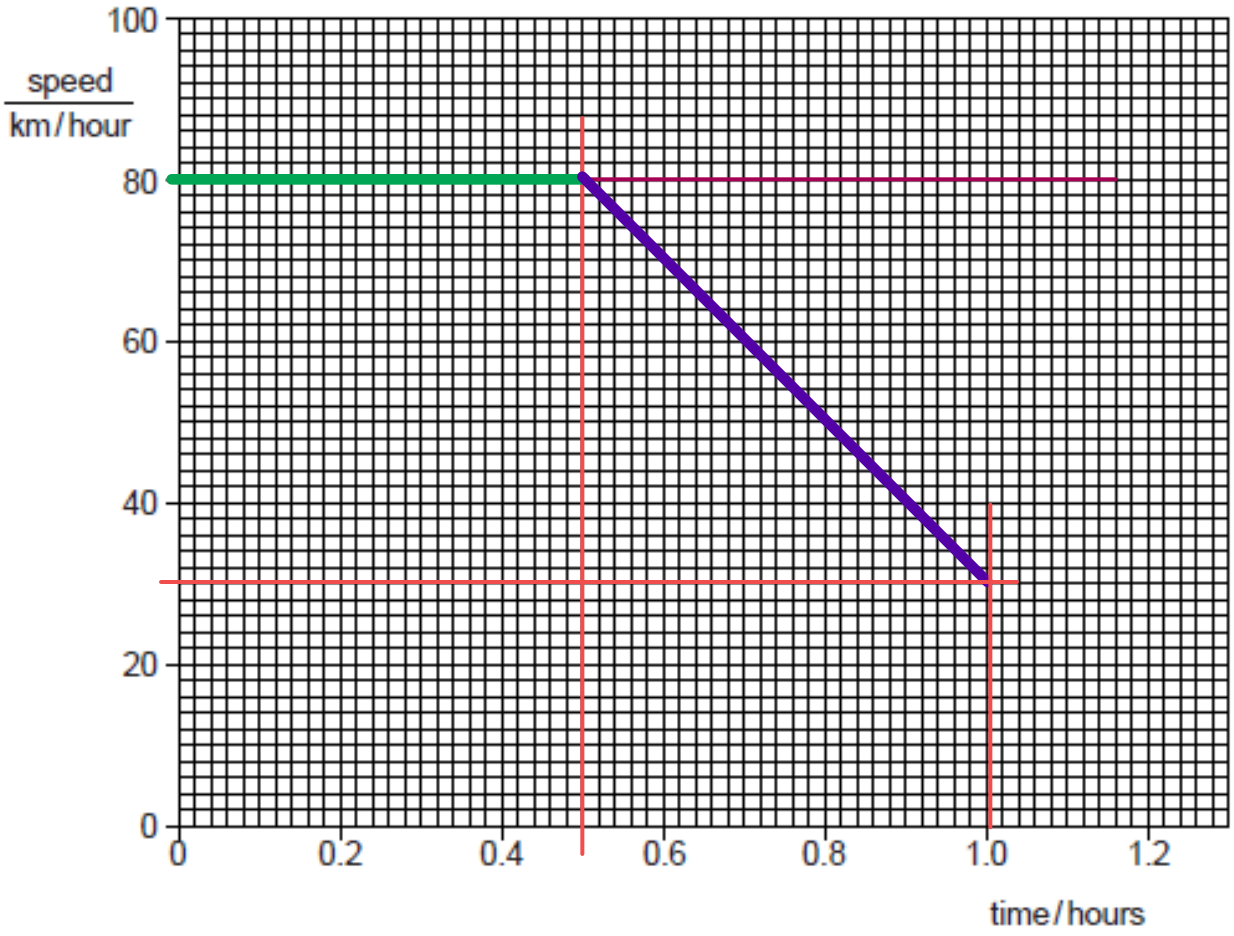


Fig. 1.2

(ii) At the end of the ½ hour, the car reaches a region where the road begins to rise up into some mountains. The car climbs the mountains for a further ½ hour.

During the climb, its speed steadily decreases to 30 km/hour. The driver then stops the car so that he can admire the view.

On Fig. 1.2, draw a line representing the climb and the stopping of the car. [4]

[Total: 10]

5

A train is passing through a station at constant speed, as shown in Fig. 3.1. The track is horizontal.

25000N 70000

Fig. 3.1

The engine produces a forward thrust of 70000N. There is a 25000N force opposing the motion, due to friction in the wheels.

(a) Mark these forces on Fig. 3.1, using an arrow labelled 70000N and an arrow labelled 25000N. [2]

(b) The train is travelling at constant speed, so there must be another horizontal force acting on it.

(i) State the direction of this force.

backward / opposing motion

(ii) Calculate the size of this force.

= 70000 − 25000 = 35000N

size of force = 35000 N

(iii) Suggest what might be causing this force.

Air resistance

[3]

(c) Once the train has passed the station, the driver increases the engine's forward thrust.

All other forces stay the same.

(i) What happens to the train? increases speed/accelerates

(ii) Why does this happen?

Unbalanced forces or forward forces greater than back wards forces

[2]

[Total: 7]