

Mr Sully Unfolds Physics
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Predicted Mock Paper 2

Physics · Foundation Tier · for the 2027 exams

Topics 4.5–4.8: Forces · Waves · Magnetism and electromagnetism · Space physics

Name _____ Class _____ Date _____

Materials

- A ruler, a protractor and a scientific calculator.
- The AQA **Physics Equations Sheet** (insert). Every equation you need is on it.

Instructions

- Use black ink or black ball-point pen. Pencil only for drawing.
- Answer **all** questions in the spaces provided.
- Show all your working: you can get marks for working even if your final answer is wrong.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is **100**.
- You are expected to use a calculator where appropriate.
- You will be assessed on your ability to use good English, organise information clearly and use specialist vocabulary where appropriate.

Time allowed: 1 hour 45 minutes. Aim for about 1 minute per mark.

Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
TOTAL	

This is not an AQA paper. It was written by Mr Sully to practise for AQA GCSE Physics (8463) Paper 2 Foundation tier. The question styles follow the AQA specification; the topic choices are a prediction and are not a guarantee of what will come up.

0 1 This question is about forces.

01.1 Which **two** forces are contact forces? **[2 marks]**

Tick (✓) two boxes.

- Air resistance ☐
- Electrostatic force ☐
- Friction ☐
- Gravity ☐
- Magnetic force ☐

01.2 Which of these is a vector quantity? **[1 mark]**

Tick (✓) one box.

- Distance ☐
- Mass ☐
- Speed ☐
- Velocity ☐

01.3 A student has a mass of 60 kg. The gravitational field strength is 9.8 N/kg. **[2 marks]**
Calculate the weight of the student.

.....

.....

.....

Answer = ... **N**

01.4 A car has a driving force of 500 N forwards. The total resistive force is 200 N backwards. **[2 marks]**
Give the size and direction of the resultant force.

.....

.....

Answer = ... **N**

01.5 Later, the resultant force on the moving car is zero. **[1 mark]**
Describe the motion of the car.

.....

01.6 The Earth pulls the student down with a force of 588 N. **[1 mark]**
What is the other force in this Newton's third law pair?

Tick (✓) one box.

- The floor pushes the student up with 588 N ☐
- The student pulls the Earth up with 588 N ☐
- The student pushes the floor down with 588 N ☐
- Air resistance on the student ☐

0 2 A student hung weights on a spring and measured the extension.

02.1 What is meant by **elastic** deformation? **[1 mark]**

.....

02.2 Table 1 shows the results. **[2 marks]**

Force (N)	0	1	2	3	4	5
Extension (cm)	0	2.0	4.0	6.0	8.0	11.5

Three results have been plotted on Figure 1. Plot the other three results.

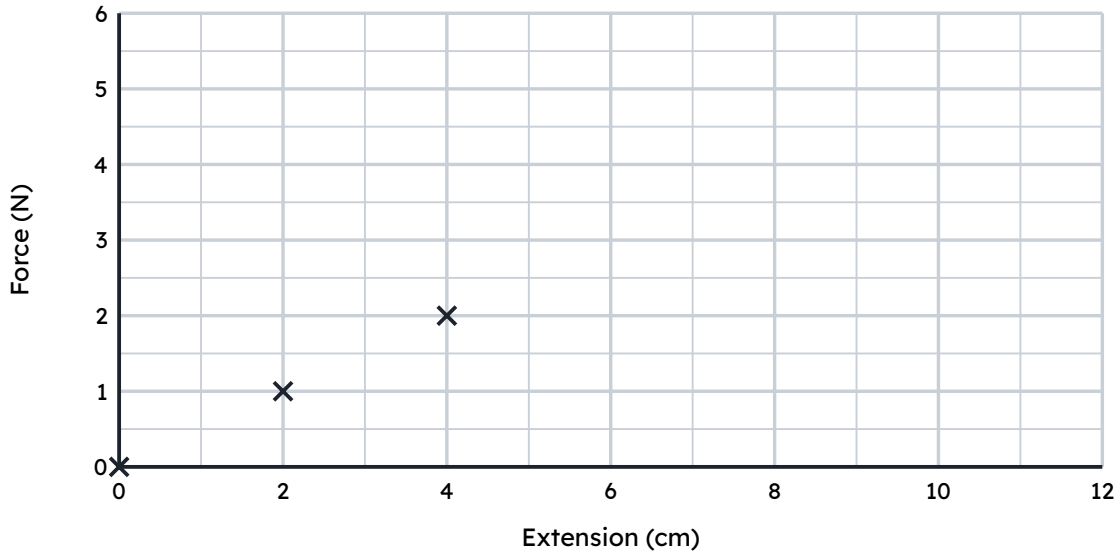


Figure 1

02.3 Draw a line of best fit on Figure 1. **[1 mark]**

02.4 Which force in Table 1 shows that the spring has gone past its limit of proportionality? **[1 mark]**

.....

Answer = ... **N**

02.5 Use the result for 2 N to calculate the spring constant of the spring. **[3 marks]**
Give your answer in N/m.

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.....

Answer = ... **N/m**

02.6 Give **one** safety precaution the student should take. **[1 mark]**

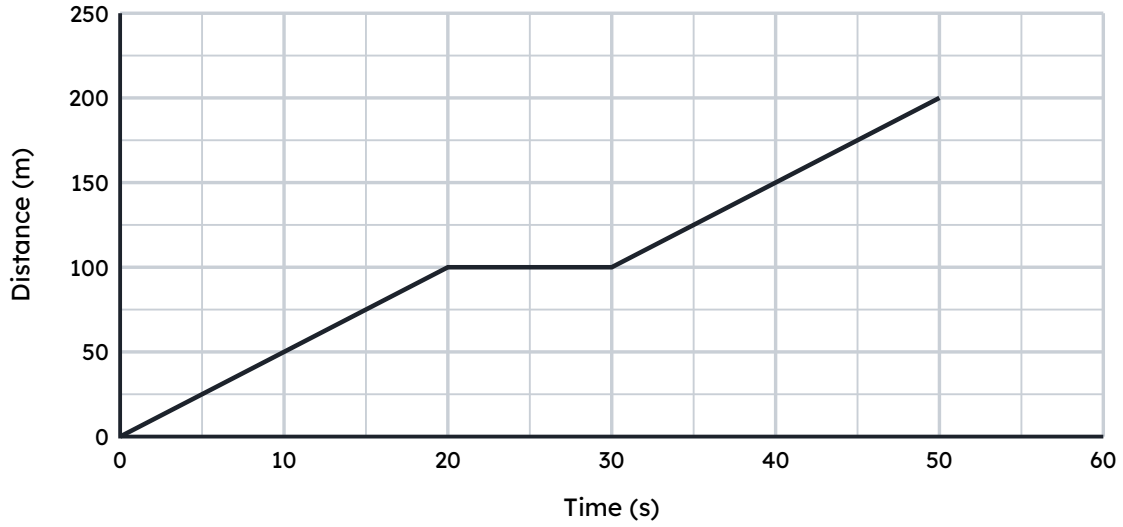
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0 3 This question is about speed and motion.

03.1 What is a typical walking speed? **[1 mark]**

Tick (✓) one box.

- 0.15 m/s ☐
- 1.5 m/s ☐
- 15 m/s ☐
- 150 m/s ☐



03.2 **[1 mark]**

Figure 2

Figure 2 shows a distance–time graph for a runner.
Describe the motion of the runner between 20 s and 30 s.

.....

03.3 Calculate the speed of the runner in the first 20 s. **[2 marks]**

.....

.....

.....

Answer = ... **m/s**

03.4 A car travels at 36 km/h. **[2 marks]**
Convert this speed into m/s.

.....

.....

.....

Answer = ... **m/s**

03.5 The car travels at 10 m/s for 2 minutes. **[3 marks]**
Calculate the distance it travels.

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.....

.....

.....

Answer = ... **m**

03.6 A cyclist speeds up from 0 m/s to 12 m/s in 4.0 s. **[2 marks]**
Calculate the acceleration of the cyclist.

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.....

.....

Answer = ... **m/s²**

0 4 This question is about the stopping distance of a car.

04.1 Complete the sentence. **[1 mark]**

Stopping distance = thinking distance + ... distance

04.2 Which **two** factors increase the thinking distance? **[2 marks]**

Tick (✓) two boxes.

Drinking alcohol	☐
Icy road	☐
Tiredness	☐
Worn brakes	☐
Worn tyres	☐

04.3 Explain why a wet road increases the braking distance. **[2 marks]**

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.....

.....

04.4 A driver has a reaction time of 0.70 s. The car is travelling at 20 m/s. **[2 marks]**

Calculate the thinking distance.

.....

.....

.....

Answer = ... **m**

04.5 The braking distance is 24 m. Calculate the stopping distance. **[1 mark]**

.....

Answer = ... **m**

04.6 Give **one** danger of a very large deceleration. **[1 mark]**

.....

0 5 This question is about waves.

05.1 Give **one** example of a transverse wave and **one** example of a longitudinal wave. **[2 marks]**

Transverse ..... Longitudinal .....

05.2 In a longitudinal wave, how do the particles vibrate? **[1 mark]**

.....

05.3 What do all waves transfer from one place to another? **[1 mark]**

Tick (✓) one box.

Energy only	☐
Matter only	☐
Energy and matter	☐
Particles	☐

05.4 Water waves in a ripple tank have a frequency of 12 Hz and a wavelength of 2.5 cm. **[3 marks]**
Calculate the speed of the waves in m/s.

Answer = ... **m/s**

05.5 Waves on a string have a frequency of 4.0 Hz. **[2 marks]**
Calculate the period of the waves.

Answer = ... **s**

05.6 To measure the wavelength in a ripple tank, a student measures the length of 10 waves and divides by 10. **[2 marks]**
Explain why this is better than measuring one wavelength.

0 6 This question is about electromagnetic waves.

06.1 Complete the electromagnetic spectrum. **[2 marks]**

Radio waves		Infrared	Visible light	Ultraviolet		Gamma rays

06.2 Complete Table 2 by giving **one** use of each type of wave. **[3 marks]**

Type of wave	**Use**
Microwaves	
Infrared	
X-rays	

06.3 Give **one** harmful effect of ultraviolet waves on the human body. **[1 mark]**

06.4 Which statement about electromagnetic waves is correct? **[1 mark]**

Tick (✓) one box.

- They all have the same frequency ☐
- They all have the same wavelength ☐
- They all travel at the same speed in a vacuum ☐
- They all need a medium to travel through ☐

06.5 When light travels from air into glass, it changes direction at the boundary. **[2 marks]**
Name this effect and explain why it happens.

06.6 In ray diagrams, angles are measured from the normal. **[1 mark]**
What is the normal?

0 7 A student investigates how light changes direction when it passes through a rectangular glass block.

07.1 Describe a method the student could use to measure the angle of incidence and the angle of refraction. **[6 marks]**

07.2 Table 3 shows the results. **[2 marks]**

Angle of incidence (°)	**20**	**40**	**60**
Angle of refraction (°)	13	25	35

Describe **two** patterns shown by the results.

0 8 This question is about magnets and electromagnets.

08.1 Draw the magnetic field pattern around the bar magnet below. **[2 marks]**



08.2 Describe the difference between a permanent magnet and an induced magnet. **[2 marks]**

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.....

.....

08.3 Which **two** materials are magnetic? **[2 marks]**

Tick (✓) two boxes.

Aluminium	☐
Copper	☐
Iron	☐
Nickel	☐
Plastic	☐

08.4 Give **two** ways to make an electromagnet stronger. **[2 marks]**

.....

.....

08.5 A compass needle points north. **[1 mark]**
What does this show about the Earth?

.....

08.6 A current flows in a straight wire. **[1 mark]**
How does the strength of the magnetic field change as you move further away from the wire?

Tick (✓) one box.

It gets stronger	☐
It gets weaker	☐
It stays the same	☐
It drops to zero straight away	☐

0 9 This question is about space. (Physics only)

09.1 Put the stages in the life cycle of a star the same size as the Sun in the correct order. **[2 marks]**
main sequence star · nebula · protostar · red giant · white dwarf

1 ..... → 2 ..... → 3 ..... → 4 ..... → 5 .....

09.2 Which force keeps the planets in orbit around the Sun? **[1 mark]**

Tick (✓) one box.

Friction	☐
Gravity	☐
Magnetism	☐
Upthrust	☐

09.3 What is the Moon an example of? **[1 mark]**

Tick (✓) one box.

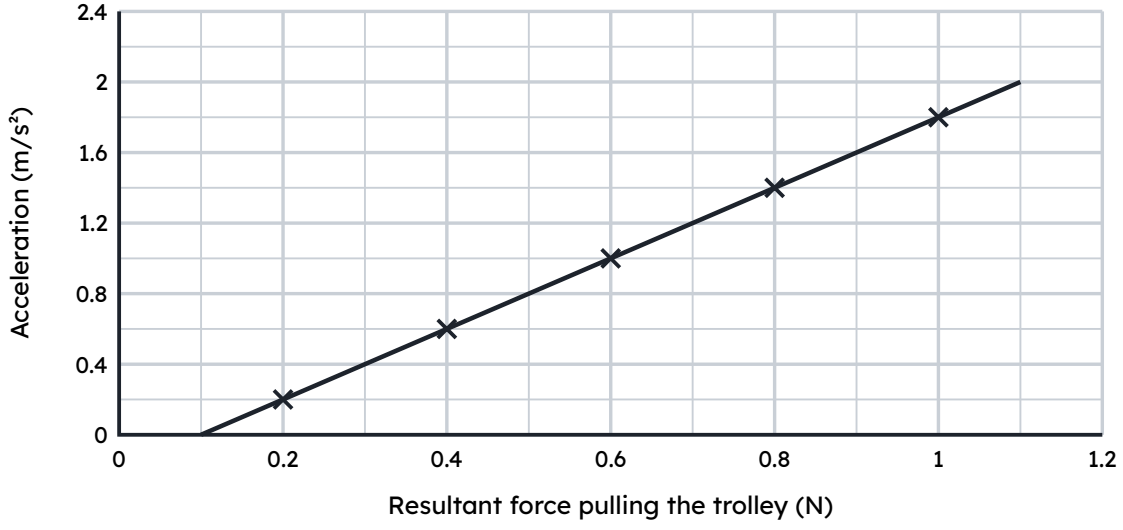
An artificial satellite	☐
A dwarf planet	☐
A natural satellite	☐
A star	☐

09.4 Light from distant galaxies is red-shifted. **[2 marks]**
What does this tell scientists?

09.5 Describe what happens during nuclear fusion in a main sequence star. **[2 marks]**

1 0 A student investigated how the resultant force on a trolley affects its acceleration.

10.1 Describe a method the student could use. Include how the student would make sure only the force changes. **[6 marks]**



10.2 **[2 marks]**

Figure 3

Figure 3 shows the results.
The line of best fit does not pass through the origin. Suggest why.

1 1 Figure 4 shows a velocity–time graph for a cyclist on a short journey.

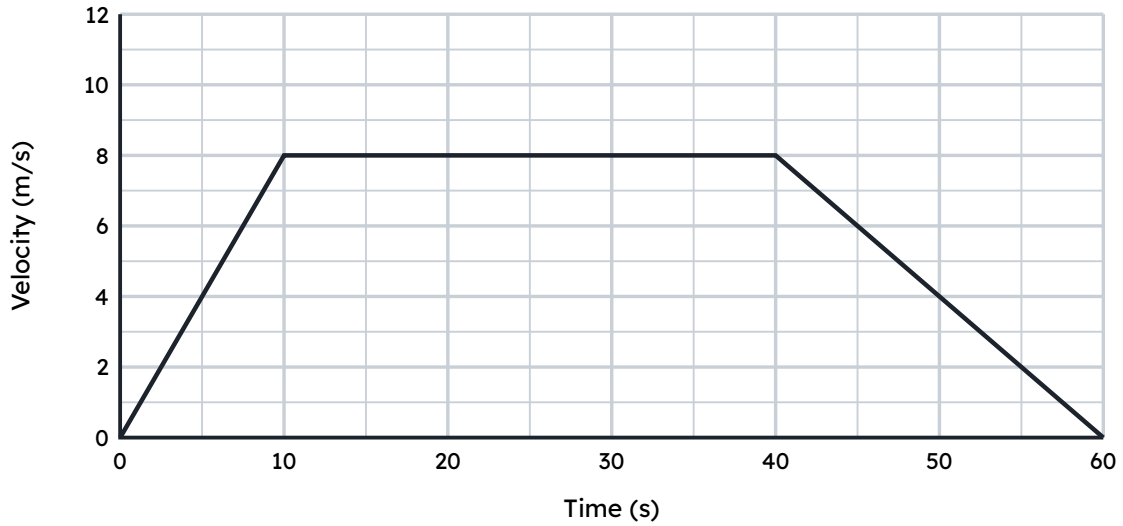


Figure 4

11.1 Describe the motion of the cyclist between 10 s and 40 s. **[1 mark]**

11.2 Calculate the acceleration of the cyclist during the first 10 s. **[2 marks]**

Answer = ... **m/s²**

11.3 Calculate the deceleration of the cyclist between 40 s and 60 s. **[2 marks]**

Answer = ... **m/s²**

11.4 During which time is the resultant force on the cyclist zero? Explain your answer. **[2 marks]**

END OF QUESTIONS