

Mr Sully Unfolds Physics
mrsullyphysics.com

Predicted Mock Paper 2

Physics · Higher Tier · for the June 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. 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 Figure 1 shows the forces acting on a drone hovering in a strong wind.

01.1 Which of the following is a vector quantity? **[1 mark]**

Tick (✓) one box.

Distance	☐
Displacement	☐
Mass	☐
Speed	☐

01.2 The drone has a mass of 2.4 kg. Calculate its weight on Mars, where the gravitational field strength is 3.7 N/kg. **[2 marks]**

Answer = ... **N**

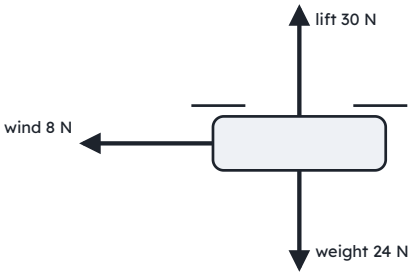

Figure 1

01.3 **[4 marks]**

Draw a vector diagram to determine the size and direction of the resultant force on the drone. Use a scale of 1 cm = 1 N. (Higher)

Answer = ... **N**

01.4 Calculate the acceleration of the drone on Earth when the resultant force on it is 10 N. **[2 marks]**

Answer = ... **m/s²**

0 2 A student investigated how the resultant force on a trolley affects its acceleration.

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

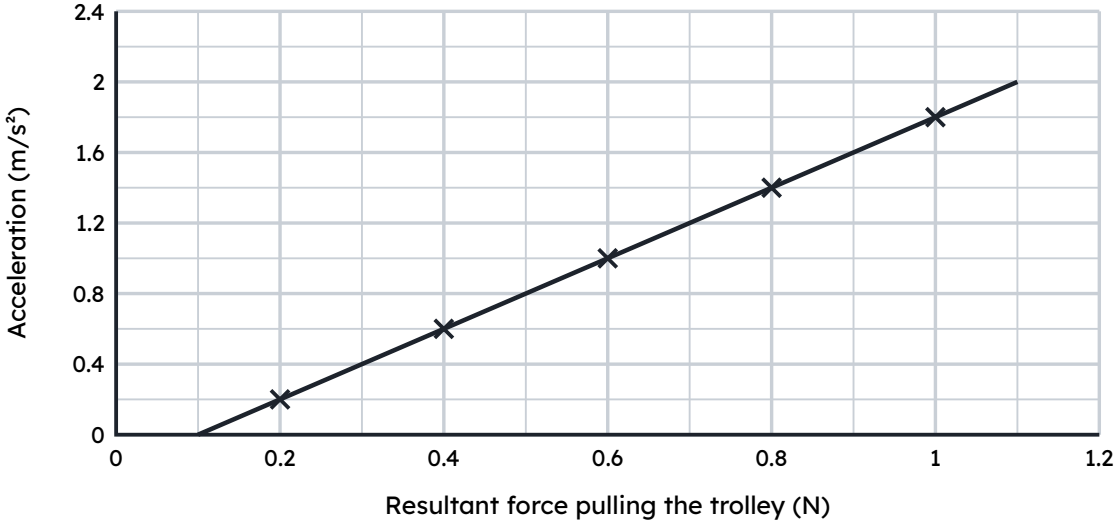

Figure 2

02.2 Figure 2 shows the results.
The line of best fit does not pass through the origin. Suggest why. **[2 marks]**

02.3 Use the gradient of Figure 2 to determine the total mass being accelerated. (Higher) **[2 marks]**

Answer = ... **kg**

0 3 This question is about stopping distances.

03.1 A student tested a friend's reaction time using a falling ruler. The ruler fell 18 cm, 20 cm and 16 cm before it was caught. **[1 mark]**
Calculate the mean distance.

Answer = ... **cm**

03.2 A driver has a reaction time of 0.60 s. The car is travelling at 25 m/s. **[2 marks]**
Calculate the thinking distance.

Answer = ... **m**

03.3 The car then decelerates at 6.25 m/s^2 until it stops. **[3 marks]**
Calculate the braking distance.

Answer = ... **m**

03.4 Calculate the stopping distance. **[1 mark]**

Answer = ... **m**

03.5 Explain how a wet road affects the stopping distance of the car. **[3 marks]**

0 4 This question is about momentum. (Higher)

04.1 A cricket ball of mass 0.16 kg is bowled at 25 m/s. **[2 marks]**
Calculate its momentum.

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

04.2 Trolley A (mass 2.0 kg) moves at 3.0 m/s and collides with stationary trolley B (mass 1.0 kg). The trolleys stick together. **[3 marks]**

Calculate their velocity just after the collision.

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

04.3 A cycle helmet contains a layer of foam that crushes in a collision. **[4 marks]**

Explain how the foam reduces the risk of injury. Use ideas about momentum.

0 5 This question is about moments and pressure. (Physics only)

05.1 A force of 40 N is applied to a spanner 0.25 m from the centre of a nut. **[2 marks]**

Calculate the moment of the force.

Answer = ... **N m**

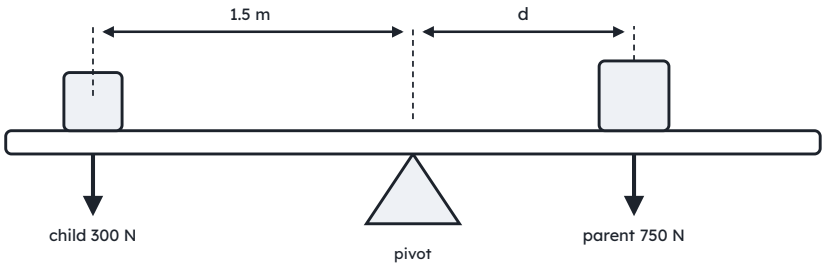

Figure 3

05.2 Figure 3 shows a child and a parent on a balanced seesaw. **[3 marks]**

Calculate distance *d*.

Answer = ... **m**

05.3 A diver is 12 m below the surface of the sea. The density of sea water is 1030 kg/m^3 and g = 9.8 N/kg. Calculate the pressure due to the water on the diver. (Higher) **[2 marks]**

Answer = ... **Pa**

05.4 Explain why an object submerged in water experiences an upthrust. (Higher) **[3 marks]**

0 6 This question is about waves.

06.1 Which list shows electromagnetic waves in order of increasing frequency? **[1 mark]**

Tick (✓) one box.

gamma, X-rays, ultraviolet, visible	
radio, microwaves, infrared, visible	
visible, infrared, microwaves, radio	
X-rays, gamma, visible, radio	

06.2 A radio station broadcasts at a frequency of 98 MHz. The speed of radio waves is 3.0 × 10^8 m/s. Calculate the wavelength of the radio waves. **[3 marks]**

Answer = ... **m**

06.3 Explain why ultraviolet radiation is more hazardous to the human body than visible light. **[2 marks]**

06.4 Ultrasound is used to scan an unborn baby. A pulse reflects from the baby and is detected 1.2 × 10^{-4} s after it was sent. **[3 marks]**
The speed of ultrasound in the body is 1500 m/s.
Calculate the distance from the probe to the baby. (Physics only)

Answer = ... **m**

06.5 Is ultrasound a transverse or a longitudinal wave? **[1 mark]**

0 7 This question is about infrared radiation.

07.1 Describe a method to investigate how the type of surface affects the amount of infrared radiation emitted. **[6 marks]**
You may include a labelled diagram.

07.2 Explain why the temperature of the Earth stays roughly constant. (Physics only) **[3 marks]**

0 8 This question is about magnetism and electromagnetism.

08.1 Explain why iron is used for the core of an electromagnet, but steel is used for a permanent magnet. **[2 marks]**

08.2 A wire of length 5.0 cm carries a current of 2.5 A at right angles to a magnetic field of flux density 0.080 T. **[3 marks]**
Calculate the force on the wire. (Higher)

Answer = ... **N**

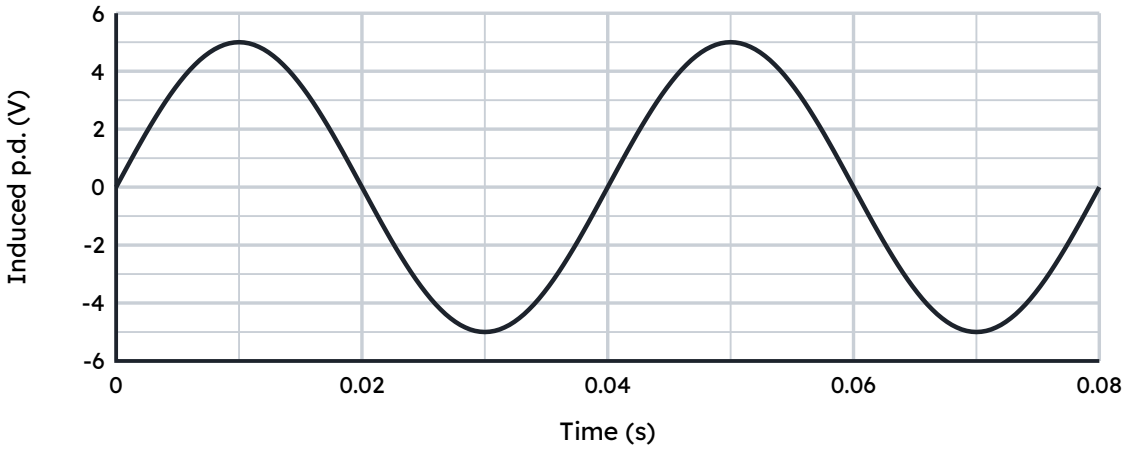

Figure 4

08.3 Figure 4 shows the output of a simple alternator.
Give **two** ways the maximum induced potential difference could be increased. (Physics only) **[2 marks]**

08.4 Describe how the output of a dynamo is different from the output in Figure 4. (Physics only) **[2 marks]**

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

09.1 Explain how an alternating potential difference across the primary coil produces a potential difference across the secondary coil. (Higher) **[4 marks]**

09.2 A transformer has 2200 turns on its primary coil and 46 turns on its secondary coil. The primary p.d. is 11 kV. **[3 marks]**
Calculate the secondary p.d. (Higher)

Answer = ... **V**

1 0 This question is about space. (Physics only)

10.1 Which element is formed by fusion in the core of a main sequence star like the Sun? **[1 mark]**

Tick (✓) one box.

Carbon	
Helium	
Iron	
Uranium	

10.2 Explain how elements heavier than iron came to be in the Earth. **[3 marks]**

10.3 A satellite is moved into a smaller stable orbit. **[3 marks]**
Explain how its speed must change. (Higher)

10.4 Since 1998, observations of supernovae have suggested that distant galaxies are receding faster and faster. **[2 marks]**
Explain what scientists have suggested to account for this.

1 1 Figure 5 shows a velocity–time graph for a cyclist on a short journey.

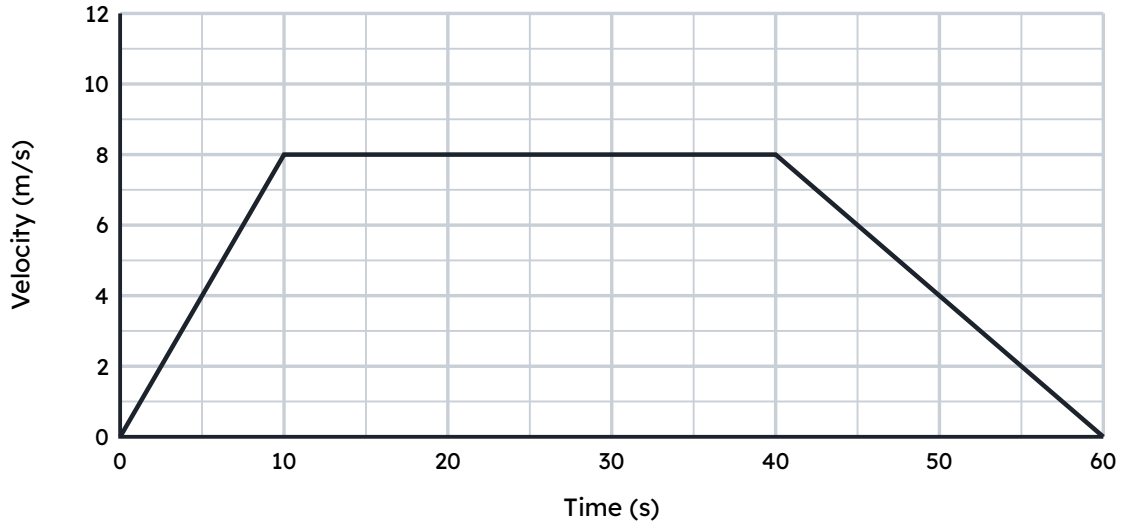

Figure 5

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 Determine the total distance travelled by the cyclist. (Higher) **[3 marks]**

Answer = ... **m**

11.4 Calculate the mean (average) velocity of the cyclist for the whole journey. **[2 marks]**

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

END OF QUESTIONS