FREE REVISION PACK

Work & Energy

AQA A-level Physics · 7407 / 7408 · Specification 3.4.1.7–3.4.1.8

Easy | Medium | Hard | Multiple choice · past-paper questions

8	8	≈ 10 min
QUESTIONS	TOTAL MARKS	SUGGESTED TIME*

Contents

Q	LEVEL	FOCUS	SOURCE	MARKS
1	Easy	Roller coaster: maximum speed	AQA June 2016 · AS Paper 2 · Q26	1 mark
2	Easy	Prefixes: which gives 1 J of work?	AQA June 2025 · A-level Paper 1 · Q11	1 mark
3	Easy	Estimating a car's kinetic energy	AQA June 2022 · A-level Paper 1 · Q9	1 mark
4	Medium	Area under a force–distance graph	AQA June 2023 · AS Paper 2 · Q34	1 mark
5	Medium	Doubling the drop height	AQA June 2023 · AS Paper 2 · Q26	1 mark
6	Medium	Kinetic energy of a pendulum	AQA June 2017 · A-level Paper 1 · Q31	1 mark
7	Hard	Friction on a ramp	AQA June 2017 · AS Paper 2 · Q5	1 mark
8	Hard	Same force, same time, different mass	AQA June 2018 · AS Paper 2 · Q27	1 mark

Key ideas to have ready

- Work done = force × distance moved in the direction of the force: $W = Fs\cos\theta$. The area under a force–distance graph is the work done.
- $E_k = \frac{1}{2}mv^2$ and $\Delta E_p = mg\Delta h$.
- Energy is conserved. Work done against friction or drag = energy transferred away from the kinetic and potential stores.
- 1 kW h = 1000 W × 3600 s = 3.6×10^6 J.

How to use this pack

1. The questions are grouped into levels (Easy, Medium and Hard). Work through them in order, and check your answers at the end of each level before moving on.
2. Every question is multiple choice with one correct answer. Write down your working anyway; that is how you find mistakes.
3. The separate mark scheme uses the same numbers and explains every answer.

Levels are based on how students did in AQA's examiner reports where that information exists, plus our own difficulty rating. *About 1.5 minutes per question.

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Easy

Definitions and one-step ideas. Most students get these right.

Questions 1–3

Only **one** answer per question is allowed. For each question, completely fill in the circle alongside the appropriate answer.

AQA June 2016 · AS Paper 2 · Q26

1 A roller coaster car is raised to a height of $65\ \text{m}$ and released from rest.

What is the maximum possible speed of the car?

[1 mark]

A $11\ \text{m s}^{-1}$ ⬭

B $25\ \text{m s}^{-1}$ ⬭

C $36\ \text{m s}^{-1}$ ⬭

D $130\ \text{m s}^{-1}$ ⬭

AQA June 2025 · A-level Paper 1 · Q11

2 A force F moves through a distance x in the direction of F.

In which row is the work done by the force $1\ \text{J}$?

[1 mark]

	F	x	
A	1 mN	1 km	⬭
B	100 kN	100 μm	⬭
C	100 MN	100 nm	⬭
D	1 GN	1 fm	⬭

AQA June 2022 · A-level Paper 1 · Q9

3 A car travels at $100\ \text{km h}^{-1}$ on a motorway.

What is an estimate of its kinetic energy?

[1 mark]

A $10^4\ \text{J}$ ⬭

B $10^6\ \text{J}$ ⬭

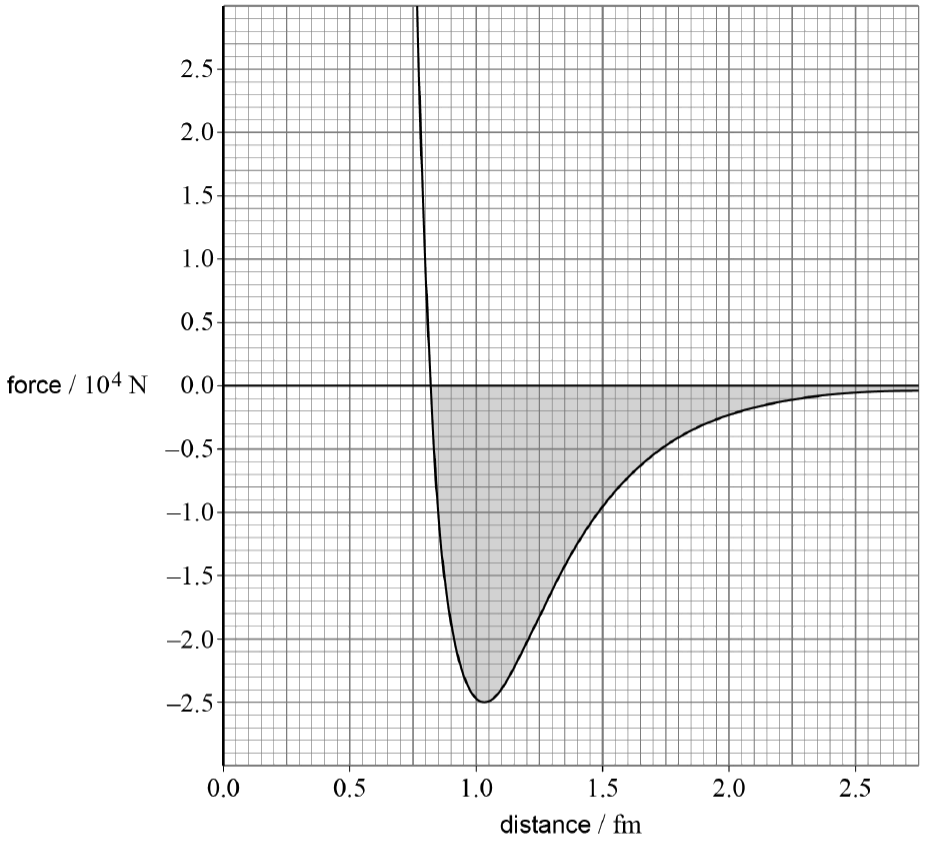
C $10^8\ \text{J}$ ⬭

D $10^{10}\ \text{J}$ ⬭

Medium Two or three steps. Roughly a third to a half of students get these right. **Questions 4–6**

AQA June 2023 · AS Paper 2 · Q34

4 The graph shows the variation of force with distance between a proton and a neutron.



The shaded area represents

[1 mark]

A acceleration. ⬭

B impulse. ⬭

C rate of change of kinetic energy. ⬭

D work done. ⬭

AQA June 2023 · AS Paper 2 · Q26

5 A ball is dropped from a height h. The ball hits the ground with a velocity v.

The ball is now dropped from a height of $2h$.
Air resistance is negligible.

What is the velocity at which the ball hits the ground?

[1 mark]

A v ⬭

B $\sqrt{2v}$ ⬭

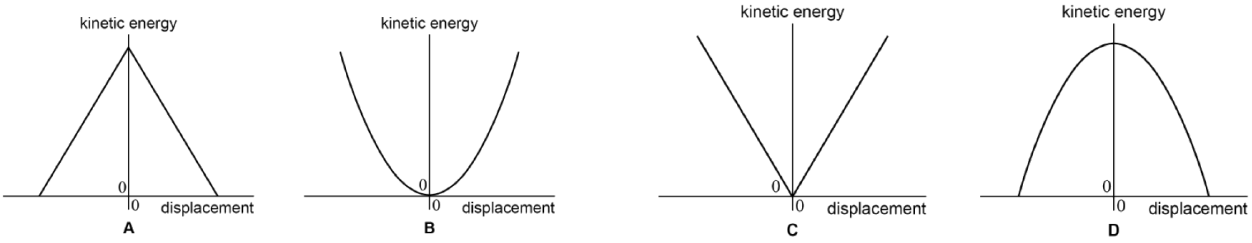
C $v\sqrt{2}$ ⬭

D $2v$ ⬭

AQA June 2017 · A-level Paper 1 · Q31

6 Which graph best shows how the kinetic energy of a simple pendulum varies with displacement from the equilibrium position?

[1 mark]



A ⬭

B ⬭

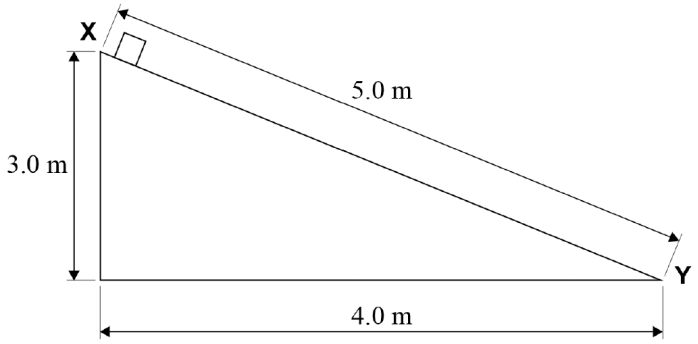
C ⬭

D ⬭

Hard Several steps, often with a trap built in. Fewer than 3 in 10 students get these right. **Questions 7–8**

AQA June 2017 · AS Paper 2 · Q5

7 A mass of 2.5 kg is released from rest at **X** and slides down a ramp, of height 3.0 m, to point **Y** as shown.



When the mass reaches **Y** at the bottom of the ramp it has a velocity of 5.0 m s^{-1}.

What is the average frictional force between the mass and the ramp?

[1 mark]

A 8.5 N ⬭

B 10.6 N ⬭

C 14.7 N ⬭

D 24.5 N ⬭

AQA June 2018 · AS Paper 2 · Q27

8 Objects **P** and **Q** are initially at rest at time $t = 0$
The same resultant force F is applied to **P** and **Q** for time T.
The mass of **P** is 10 times greater than the mass of **Q**.

What is the ratio $\frac{\text{kinetic energy of } \mathbf{P}}{\text{kinetic energy of } \mathbf{Q}}$?

[1 mark]

A 0.1 ⬭

B 1 ⬭

C 10 ⬭

D 100 ⬭

End of questions. Check your answers with the matching mark scheme. More free packs and 1-to-1 tuition:
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