GET BETTER AT PHYSICS · MARK SCHEME

Power & Efficiency: tiered multiple choice

AQA A-level Physics · 7407 / 7408 · Specification 3.4.1.7 · 5 questions · 5 marks

1 mark per correct letter | Worked reasoning for every question

How students did = from AQA examiner reports, where available

Answer key

Q1	Q2	Q3	Q4	Q5
C	C	B	D	C

Easy

Question 1

1 **C**

Facts about mechanical power · AQA November 2020 · A-level Paper 1 · Q6

Power = work ÷ time, in J s^{-1}. A joule is kg m^2 s^{-2}, so a watt is kg m^2 s^{-3}. Power is a scalar, it is not measured in J, and force × distance gives work, not power.

Medium

Questions 2–4

2 **C**

Car driving up a hill · AQA June 2018 · AS Paper 2 · Q21

At steady speed with no resistance, the driving force equals the weight's component down the slope: 950 × 9.81 × sin 12° = 1940 N. v = P / F = 65 000 / 1940 = 34 m s^{-1}.

Watch out: 7.0 m s^{-1} (A) divides by the full weight. Only the component along the slope opposes the car.

How students did: 41% of students got this right in June 2018.

3 **B**

Which is not a unit of power? · AQA June 2016 · AS Paper 2 · Q25

J s is energy × time, which is not power (power is energy ÷ time). N m s^{-1} = J s^{-1}, W and kg m^2 s^{-3} are all units of power.

How students did: 40% of students got this right in June 2016.

4 **D**

Climber descending on a brake · AQA June 2022 · AS Paper 2 · Q27

At steady speed the kinetic energy does not change, so all the potential energy lost goes to the brake and rope. Rate = mgv = 60 × 9.81 × 0.50 = 294 W ≈ 290 W.

Hard

Question 5

5 **C**

Extra power needed on a hill · AQA June 2025 · AS Paper 2 · Q34

On the level at steady speed, thrust = resistive force = 3800 N. On the hill the engine must also overcome the weight's component: 12 000 × sin 10° = 2080 N. Thrust = 3800 + 2080 = 5880 N, so P = Fv = 5880 × 15 = 88 kW.

> **Watch out:** 57 kW (B) forgets the hill and 31 kW (A) forgets the resistive force. The engine has to deal with both.

How students did: In June 2025 the correct answer was the most popular choice.

End of mark scheme

Answers from AQA's published keys; explanations written for this pack. AQA material is © AQA.
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