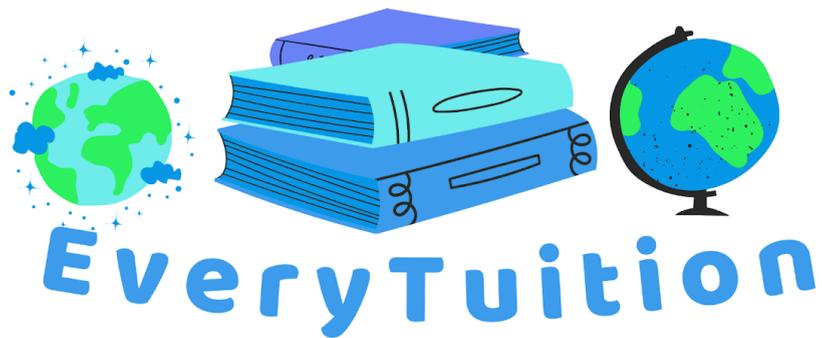


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# GCSE Physics Topic 1 AQA: Energy

Exam Questions/Mock Exam Questions



**Questions For Foundation, Higher, and Triple Science [\(scroll down for questions for higher and triple science only\)](#):**

(It would still be recommended to answer the foundation tier questions for triple science and higher tier to ensure you have good understanding).

**Q1.**

Jack is revising energy stores.  
State the unit of energy.

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[1]

**Q2.**

Harry drops a ball from a height.

(a) Name the energy store that decreases as the ball falls.

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[1]

(b) Name the energy store that increases as the ball falls.

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[1]

[Total: 2 marks]

**Q3.**

Ben lifts a box vertically.

(a) State the equation linking gravitational potential energy, mass,  $g$  and height.

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[1]

(b) A 5.0 kg box is lifted 2.0 m (use  $g = 9.8 \text{ N/kg}$ ). Calculate the increase in gravitational potential energy.

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[2]

[Total: 3 marks]

**Q4.**

Daniel rides a bicycle downhill.

Explain what happens to the cyclist's kinetic energy when brakes are applied.

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[3]

**Q5.**

Oliver stretches a spring.

(a) State Hooke's law in equation form.

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[1]

(b) A spring constant is 200 N/m and it is extended by 0.05 m. Calculate the force.

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[2]

[Total: 3 marks]

**Q6.**

Ethan heats water in a kettle.

(a) State the equation linking energy transferred, mass, specific heat capacity and temperature change.

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[1]

(b) How much energy is needed to raise 0.5 kg of water by 20 °C? ( $c = 4200 \text{ J/kg}^\circ\text{C}$ )

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[3]

[Total: 4 marks]

**Q7.**

Sam is revising efficiency.

A device outputs 150 J usefully from 300 J supplied. Calculate the efficiency as a percentage.

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[2]

**Q8.**

Charlie looks at Sankey diagrams.

(a) State what a Sankey diagram represents.

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[1]

(b) Give one example of wasted energy in a household.

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[1]

[Total: 2 marks]

**Q9.**

Noah studies energy transfers in homes.

Give two ways to reduce heat loss from a house.

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[2]

**Q10.**

Jacob compares renewable and non-renewable energy resources.

(a) Give one example of a renewable energy source.

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[1]

(b) Give one example of a non-renewable energy source.

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[1]

(c) State one advantage of renewable sources.

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[1]

[Total: 3 marks]

**Q11.**

William investigates power.

(a) State the equation linking power, energy transferred and time.

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[1]

(b) A hairdryer transfers energy at 1200 W for 10 minutes. Calculate the energy transferred in kJ.

[3]

[Total: 4 marks]

**Q12.**

Alex studies transport and energy.

Give one way that cars can be made more energy efficient.

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[1]

**Q13.**

Luke is revising energy and temperature.

(a) Define specific latent heat of fusion.

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[2]

(b) Give one everyday example where latent heat is important.

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[1]

[Total: 3 marks]

**Q14.**

James learns about electrical energy.

A 60 W bulb is on for 3 hours. Calculate the energy used in kilowatt-hours.

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[3]

**Q15.**

Tom plans an experiment to compare energy released by different fuels.  
Plan the experiment. Include:

- the apparatus you would use
- the measurements you would take
- how you would make the comparison fair

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[6]

**Higher Tier**

**Q16.**

Jack drops a stone into a lake.

(a) State the energy store that decreases as the stone falls.

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[1]

(b) Describe two other energy stores that increase as the stone enters the water.

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[2]

[Total: 3 marks]

**Q17.**

Harry lifts a 12 kg box 1.5 m vertically.

(a) State the equation for gravitational potential energy.

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[1]

(b) Calculate the increase in gravitational potential energy. ( $g = 9.8 \text{ N/kg}$ )

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[3]

[Total: 4 marks]

**Q18.**

Ben fires an arrow from a bow.

(a) Name the energy store that decreases as the string is released.

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[1]

(b) Explain how energy is transferred to the arrow as it moves.

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[3]

[Total: 4 marks]

**Q19.**

Daniel rides a motorbike at a constant speed.  
Explain, using ideas of energy transfer, why fuel is still needed.

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[4]

**Q20.**

Oliver investigates a falling object.

The object has a mass of 2.0 kg and falls 10 m.

(a) Calculate the gravitational potential energy lost.

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[2]

(b) If the object reaches a speed of 12 m/s, calculate its kinetic energy.

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[2]

(c) Explain why the kinetic energy is less than the gravitational potential energy lost.

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[2]

[Total: 6 marks]

**Q21.**

Ethan heats 0.75 kg of water from 20 °C to 100 °C. ( $c = 4200 \text{ J/kg}^\circ\text{C}$ )

(a) Calculate the energy transferred to the water.

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[3]

(b) Suggest why the actual energy supplied by the kettle is more than this calculated value.

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[2]

[Total: 5 marks]

**Q22.**

Sam compares two light bulbs.

(a) State the equation for efficiency using power.

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[1]

(b) A bulb transfers 8 W usefully from 40 W supplied. Calculate its efficiency as a percentage.

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[2]

(c) Suggest one advantage of using a more efficient bulb.

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[1]

[Total: 4 marks]

**Q23.**

Charlie builds an insulated container to reduce heat loss.

(a) Suggest two methods he could use to reduce heat transfer.

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[2]

(b) Explain how shiny surfaces help reduce energy transfer.

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[2]

[Total: 4 marks]

**Q24.**

Noah compares fossil fuels and wind turbines.

Evaluate the environmental impacts of using fossil fuels compared with wind power.

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[5]

**Q25.**

Jacob studies nuclear power stations.

(a) State one advantage of using nuclear fuel.

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[1]

(b) State one disadvantage of using nuclear fuel.

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[1]

(c) Explain why some people oppose nuclear power stations.

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[2]

[Total: 4 marks]

**Q26.**

William tests a motor.

The motor transfers 480 J in 30 s.

(a) Calculate the power of the motor.

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[2]

(b) Explain why the useful power output is less than this value.

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[2]

[Total: 4 marks]

**Q27.**

Alex wants to calculate energy costs.

(a) Write the equation for energy transferred using power and time.

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[1]

(b) A washing machine uses 2.0 kW for 2 hours. Calculate the energy transferred in kWh.

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[2]

(c) If the cost of electricity is 25 p per kWh, calculate the total cost.

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[2]

[Total: 5 marks]

**Q28.**

Luke drops a hammer onto a nail.

(a) Explain the energy transfers involved.

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[3]

(b) Give one reason why the hammer does not transfer all its energy usefully.

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[1]

[Total: 4 marks]

**Q29.**

James investigates insulation.

He wraps hot water containers with different materials.

(a) State the independent variable in this experiment.

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[1]

(b) State the dependent variable in this experiment.

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[1]

(c) Suggest one control variable.

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[1]

[Total: 3 marks]

**Q30.**

Tom studies specific latent heat.

(a) Define specific latent heat of vaporisation.

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[2]

(b) Explain why temperature remains constant while water boils.

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[3]

[Total: 5 marks]

**Q31.**

Jack lifts weights in a gym.

Explain, in terms of work done and energy transfer, why he gets tired.

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[3]

**Q32.**

Harry studies renewable resources.

(a) State one advantage of wind power.

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[1]

(b) State one disadvantage of wind power.

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[1]

(c) Explain why wind power alone cannot meet electricity demand in the UK.

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[2]

[Total: 4 marks]

**Q33.**

Ben investigates a 1.5 kW kettle used for 3 minutes.

(a) Calculate the energy transferred.

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[3]

(b) Give one way to reduce wasted energy in this process.

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[1]

[Total: 4 marks]

**Q34.**

Daniel rides an electric scooter.

(a) State one renewable energy resource that could be used to charge the scooter.

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[1]

(b) Suggest one disadvantage of using only renewable sources for charging.

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[1]

[Total: 2 marks]

**Q35.**

Oliver plans an investigation into how surface area affects cooling.

Describe how he could carry out this experiment.

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[5]

**Q36.**

Ethan studies a power station.

(a) State the main energy store for coal.

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[1]

(b) Explain how this energy is transferred to generate electricity.

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[3]

[Total: 4 marks]

**Q37.**

Sam studies tidal power.

Suggest one reason why tidal power is more reliable than wind power.

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[1]

**Q38.**

Charlie studies wasted energy.

(a) State one example of wasted energy in a washing machine.

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[1]

(b) Give one method to reduce this wasted energy.

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[1]

[Total: 2 marks]

**Q39.**

Noah tests an electric heater.

It transfers 3000 J of energy in 20 s.

(a) Calculate its power.

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[2]

(b) Explain why the heater cannot be 100% efficient.

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[2]

[Total: 4 marks]

**Q40.**

Jacob looks at pumped storage hydroelectric power.

Evaluate the advantages and disadvantages of pumped storage power stations.

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[5]

## Triple Science

**Q41.**

William measures the specific heat capacity of aluminium.

Describe a method he could use, including:

- the apparatus
- the measurements taken
- how to ensure accuracy

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[6]

**Q42.**

Alex studies power output.

A motor lifts a 50 kg load 6.0 m in 12 s.

(a) Calculate the work done.

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[2]

(b) Calculate the power output of the motor.

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[2]

(c) Explain why the useful power is less than this calculated value.

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[2]

[Total: 6 marks]

**Q43.**

Luke studies the efficiency of an electric motor.

(a) State two equations for efficiency.

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[2]

(b) A motor transfers 1200 J usefully from 2000 J input. Calculate its efficiency as a decimal and as a %.

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[3]

[Total: 5 marks]

**Q44.**

James investigates thermal conductivity of different metals.

Describe an experiment to compare thermal conductivity, including measurements and control variables.

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[5]

**Q45.**

Tom studies a nuclear power station.

(a) State the energy store for nuclear fuel.

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[1]

(b) Explain the energy transfers that occur in a nuclear reactor to produce electricity.

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[4]

[Total: 5 marks]

**Q46.**

Jack investigates a solar panel.

(a) The panel produces 100 W for 5 hours. Calculate the energy output in kWh.

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[2]

(b) Explain one limitation of using solar panels in the UK.

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[2]

[Total: 4 marks]

**Q47.**

Harry studies cogeneration (combined heat and power).

Explain the advantages of cogeneration compared with conventional power stations.

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[4]

**Q48.**

Ben investigates tidal barrages.

Evaluate the advantages and disadvantages of tidal barrages for electricity generation.

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[5]

**Q49.**

Daniel studies biofuels.

(a) Give one environmental advantage of biofuels.

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[1]

(b) Give one disadvantage of biofuels.

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[1]

(c) Explain why biofuels are considered carbon neutral.

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[2]

[Total: 4 marks]

**Q50.**

Oliver measures efficiency of a kettle.

(a) He supplies 450 kJ of energy, but only 330 kJ heats the water. Calculate the efficiency as a %.

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[2]

(b) Suggest two ways to improve the efficiency of the kettle.

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[2]

[Total: 4 marks]

**Q51.**

Ethan studies work done.

A crane lifts 2000 kg through 8 m.

(a) Calculate the work done.

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[2]

(b) If the lift takes 40 s, calculate the power output.

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[2]

[Total: 4 marks]

**Q52.**

Sam investigates insulation thickness.

Plan an investigation to test how thickness of insulation affects cooling rate. Include:

- apparatus
- method
- variables

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[6]

**Q53.**

Charlie calculates cost of electricity.

A household uses 12 kWh of energy in one day.

If the cost is 30 p per kWh, calculate the total daily cost.

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[2]

**Q54.**

Noah studies energy storage methods.

Compare batteries with pumped storage hydroelectric schemes.

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[5]

**Q55.**

Jacob is asked to evaluate renewable energy.

Discuss the social, economic and environmental impacts of switching from fossil fuels to renewables.

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[6]