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Year 10–11 • GCSE & IGCSE Physics

Energy Stores & Transfers



Mark Scheme – Teacher Copy

Answers, marking points and guidance for the Energy Stores and Transfers worksheet.

Energy stores | Transfers | KE & GPE | Power | Efficiency | Resources

KEY IDEAS IN THIS WORKSHEET | TAKE g = 10 N/kg | YEAR 10–11

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Energy stores and transfers	**13 marks**
Section B	Energy calculations	**16 marks**
Section C	Efficiency and energy resources	**22 marks**

Marking notes

- (1) = one mark for each marking point.
- / separates alternative answers.
- Allow error carried forward in calculations.
- Accept any correct, clearly expressed alternative.

Total marks

51

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Energy Stores and Transfers Worksheet – Mark Scheme

Total: 51 marks. (1) = one mark. Accept any scientifically correct alternative wording.

Section A – Energy stores and transfers

Q	Answer	Mark	Guidance
1(a)	conservation of energy	1	
1(b)	dissipated (1); thermal (1)	2	
1(c)	kinetic (1); gravitational potential (1)	2	
2	kettle: electrical → thermal (1); loudspeaker: electrical → sound / kinetic (1); solar cell: light (radiation) → electrical (1); wind turbine: kinetic → electrical (1)	4	1 mark each
3	kinetic energy in the thrower's hand / arm transfers to kinetic energy of the ball (1); as it rises, kinetic → gravitational potential (1); at the top it is (all) gravitational potential (1); on the way down, gravitational potential → kinetic (1)	4	allow: some energy dissipated by air resistance
	Section A total	**13**	

Section B – Energy calculations

Q	Answer	Mark	Guidance
4	KE = ½ m v^2 (1); 0.5 × 1200 × 15^2 (1); = 135 000 J (1)	3	allow 1.35 × 10^5 J
5	GPE = m g h = 60 × 10 × 25 (1); = 15 000 J (1)	2	
6	GPE = 0.5 × 10 × 20 = 100 J (1); KE gained = 100 J (1); 100 = ½ × 0.5 × v^2 (1); v = 20 m/s (1)	4	ecf
7	E = ½ k e^2 (1); 0.5 × 200 × 0.10^2 (1); = 1.0 J (1)	3	
8	weight = 20 × 10 = 200 N (1); work done = 200 × 3.0 = 600 J (1); power = 600 ÷ 6.0 (1); = 100 W (1)	4	ecf
	Section B total	**16**	

Section C – Efficiency and energy resources

Q	Answer	Mark	Guidance
9	8 ÷ 100 (1); = 0.08 or 8% (1); the rest is dissipated (to the surroundings) as thermal energy (1)	3	
10	any two, each with an explanation: loft insulation / cavity wall insulation / double glazing reduces energy transfer by conduction (2); thick curtains / draught proofing reduce energy transfer by convection (2)	4	1 mark for the method, 1 for the explanation
11	coal: non-renewable; releases CO_2 / reliable. Wind: renewable; no pollution but depends on the wind. Solar: renewable; depends on sunshine. Nuclear: non-renewable; no CO_2 but radioactive waste.	8	1 mark for each correct renewable / non-renewable, 1 mark for each valid advantage or problem
12	some energy is always dissipated to the surroundings as thermal energy (1); through friction / resistance / sound (1)	2	
13	measure the mass of the block / water (1); use an electric heater with a joulemeter, or measure current, potential difference and time (1); record the temperature rise (1); insulate to reduce energy loss (1); calculate $c = E \div (m \times \Delta\theta)$ (1)	5	Higher tier / Extended
	Section C total	**22**	

Worksheet total: 51