GCSE and IGCSE Physics: Energy Stores and Transfers Worksheet - Mark Scheme

Year 10-11 · GCSE (AQA 4.1) and Cambridge IGCSE 0625 topic 1.7 · Exam-style questions

Section A: Energy stores and transfers [13 marks]

1(a)	conservation of energy	**1**
1(b)	dissipated; thermal	**2**
1(c)	kinetic; gravitational potential	**2**
2	Electrical to thermal; electrical to sound (kinetic); light (radiation) to electrical; kinetic to electrical. Guidance: 1 mark each.	**4**
3	Kinetic energy in the thrower's hand transfers to kinetic energy of the ball (1). As it rises, kinetic transfers to gravitational potential (1). At the top it is all potential (1). On the way down, potential transfers back to kinetic (1).	**4**

Section B: Energy calculations [16 marks]

4	KE = ½ m v^2 (1); 0.5 × 1200 × 225 (1) = 135 000 J (1).	**3**
5	GPE = mgh = 60 × 10 × 25 (1) = 15 000 J (1).	**2**
6	GPE = 0.5 × 10 × 20 = 100 J (1). KE = 100 J (1). 100 = ½ × 0.5 × v^2 (1); v = 20 m/s (1).	**4**
7	E = ½ k e^2 (1); 0.5 × 200 × 0.01 (1) = 1.0 J (1).	**3**
8	Weight = 200 N (1); work = 200 × 3 = 600 J (1); power = 600 ÷ 6 (1) = 100 W (1).	**4**

Section C: Efficiency and energy resources [22 marks]

9	8 ÷ 100 (1) = 0.08 or 8% (1). The rest is dissipated as thermal energy (1).	**3**
10	Any two with explanation: loft insulation / cavity wall / double glazing reduces heat conduction (2); thick curtains / draught proofing reduces convection (2).	**4**
11	Coal: non-renewable; produces CO_2. Wind: renewable; no pollution but depends on wind. Solar: renewable; depends on sunshine. Nuclear: non-renewable; no CO_2 but radioactive waste. Guidance: 1 mark for each correct renewable status and 1 mark for each valid advantage or problem.	**8**
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 material (1). Use a heater and joulemeter / measure current, potential difference and time (1). Record temperature rise (1). Insulate to reduce energy loss (1). Use c = E ÷ (m × ??) (1). Guidance: Higher tier / Extended.	**5**

Total: 51 marks. Accept any scientifically correct alternative wording.