

Q1. (2018)

03.4	reduces the amount of friction	do not accept reference to friction between the wheels and the ramp	1	AO2 6.1.2.1	
	so more energy is usefully transferred	allow less energy is wasted or less heating	1	AO1 6.1.2.1	
	greater kinetic energy		1	AO2 6.1.2.1	

Q2. (2019)

a)

02.1	the brightness of the lamp		1	AO3/3a 6.1.3c WS 2.2	A
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b)

02.2	zero error		1	AO3/3b 6.1.3c WS 3.7	A
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c)

02.3	C		1	AO3/1b 6.1.3c WS 3.7	A
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d)

02.4	10.0	allow 10	1	AO3/1a 6.1.3c WS 3.5	G
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e)

02.5		an answer of 0.12 or 12% scores 2 marks		AO2.1 6.1.2.2	E
	$\frac{0.96}{8.0}$		1		
	= 0.12	allow 12%	1		

Q3. (2019)

02.7		an answer of 15 000 (J) scores 3 marks		AO2.1 6.2.4.2	E
	$E = 490 \times 31$		1		
	$E = 15\,190$	allow 15 200 if correct substitution is seen	1		
	$E = 15\,000 \text{ (J)}$	allow an answer to 2 s.f. consistent with their calculated value of E using $E=QV$	1		

Q4. (2020)

a)

03.4	less energy is needed to heat the house		1	AO3
	the roof is a better insulator		1	6.1.2.1
b)				
03.5	$E = 26\,000 \times 30$		1	AO2
	780 000 (J)		1	6.1.1.4 6.2.4.2
c)				
03.6	efficiency = $\frac{\text{useful power output}}{\text{total power input}}$		1	AO1 6.1.2.2

03.7	$0.15 = \frac{\text{useful power output}}{26000}$		1	AO2
	useful power output = 26000×0.15		1	6.1.2.2
	useful power output = 3900 (W)		1	

Q5. (2021)

a)				
02.6	the rate at which the athlete transfers energy		1	AO1 6.1.1.4
b)				
02.7	more than	answers must be in this order	1	AO1
	less than		1	6.1.1.4

Q6. (2021)

a)				
04.4	0.61×1100		1	AO2
	671 (W)	allow 670 (W)	1	6.1.2.2
b)				
04.8	thermal insulation decreases the rate of energy transfer		1	AO1 6.1.2.1
c)				
04.9	B		1	AO2 6.1.2.1

Q7. (2022)

a)

02.4		this order only		
	kinetic		1	AO1 6.1.1.1 6.3.2.1
	internal		1	

b)

2.7	less energy is transferred		1	AO1 6.1.2.2
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Q8. (2022)

a)

04.1	$\Delta\theta = \frac{7.5}{30}$		1	AO2 6.1.2.1
	$\Delta\theta = 0.25$ (°C)		1	

b)

04.2	bar Y drawn to 16 and bar Z drawn to 12	allow $\pm$ half a small square	1	AO2 6.1.2.1
	y-axis labelled 'temperature in °C'	unit must be present	1	

c)

04.3	Y		1	AO3 6.1.2.1
	because it showed the smallest change in temperature	reason only scores if Y is chosen	1	

d)

04.4	less than 12.0 °C		1	AO3 6.1.2.1
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Q9. (2022)

06.1	Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	5–6	AO1 6.1.1.3 6.3.2.2 RPA14
	Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.	3–4	
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1–2	
	No relevant content.	0	
	Indicative content <ul style="list-style-type: none"> measure mass of oil using the top pan balance measure start temperature of oil using the thermometer place beaker of oil on heater switch on heater to heat oil measure final temperature of oil using the thermometer measure energy transferred using joulemeter calculate increase in temperature ($\Delta\theta$) use the equation $E = mc\Delta\theta$ to determine c 		

Q10. (2023)

a)

02.5	some energy is transferred to the surroundings	1	AO1 6.1.1.1 6.1.2.1
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b)

02.6	speed will increase	1	AO1 6.1.2.1
	(because work done against) friction decreases	1	

Q11. (2024)

a)

02.3	9600 (J)	1	AO2 6.1.1.4
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b)

02.4	1 W	1	AO1 6.1.1.4
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