

Q1. (2018)

a)

03.1		an answer of 1960 scores 2 marks		AO2 6.1.1.2
	$E_p = 50 \times 9.8 \times 4.0$		1	
	$E_p = 1960 \text{ (J)}$	allow an answer rounded to 2000 (J)	1	
		allow a maximum of 1 mark if $g = 10 \text{ N/kg}$ is used		

b)

03.2		an answer of 1225 scores 2 marks		AO2 6.1.1.2
	$E_k = 0.5 \times 50 \times 7^2$		1	
	$E_k = 1225 \text{ (J)}$	allow 1200 or 1230 (J)	1	

Q2. (2019)

05.5	gravitational potential energy = mass $\times$ gravitational field strength $\times$ height or $E_p = m g h$	allow gpe allow any correct re-arrangement	1	AO1.1 AO1 in isolation 6.1.1.2	E
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Q3. (2019)

05.6		an answer of 0.10 (m) scores 3 marks		AO2.1 6.1.1.2 WS 3.3	E
	$0.049 = 0.050 \times 9.8 \times h$		1		
	$h = \frac{0.049}{0.050 \times 9.8}$		1		
	$h = 0.10 \text{ (m)}$		1		

Q4. (2021)

a)

02.3	$E_p = 50 \times 9.8 \times 3.0$		1	AO2 6.1.1.1
	$E_p = 1470 \text{ (J)}$	allow 1500 (J)	1	6.1.1.2

b)

02.4	speed = $\sqrt{2 \times \frac{1600}{50}}$		1	AO2
	speed = 8	allow 8.0	1	AO2
	m/s		1	AO1 6.1.1.1 6.1.1.2

Q5. (2021)

04.7	$8\,400\,000 = 80 \times 4200 \times \Delta\theta$		1	AO2
	$\Delta\theta = \frac{8400000}{80 \times 4200}$		1	6.1.1.3 6.3.2.2
	$\Delta\theta = 25\ (^{\circ}\text{C})$		1	

Q6. (2022)

a)

02.3	$E = 1300 \times 9.8 \times 4.0$		1	AO2
	$E = 50960\text{ (J)}$	allow 51000 (J)	1	6.1.1.2

b)

2.6	$E_e = 0.5 \times 880\,000 \times 0.015^2$		1	AO2
	$E_e = 99\text{ (J)}$		1	6.1.1.2

Q7. (2022)

04.5	$E = 0.0150 \times 334\,000$		1	AO2
	$E = 5010\text{ (J)}$		1	6.3.2.3

Q8. (2023)

a)

02.1	decreases		1	AO1 6.1.1.1
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b)

02.2	increases		1	AO 1.1 6.1.1.1
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c)

02.3	$E_p = 2.5 \times 9.8 \times 3.4$		1	AO2
	$E_p = 83.3\text{ (J)}$	allow 83 (J)	1	6.1.1.1 6.1.1.2

d)

02.4	$E_k = 0.5 \times 2.5 \times 4.8^2$		1	AO2
	$E_k = 28.8\text{ (J)}$	allow 29 (J)	1	6.1.1.1 6.1.1.2

Q9. (2023)

03.1	$\Delta E = 4.0 \times 420 \times 50$		1	AO2
	$\Delta E = 84\,000\text{ (J)}$		1	6.1.1.3 6.3.2.2

Q10. (2024)

a)

02.2	$\Delta E = 15 \times 3800 \times 9.0$		1	AO2
	513 000 (J)		1	6.3.2.2 6.1.1.3

b)

02.5	height = $\frac{196}{5.0 \times 9.8}$		1	AO2
	4 (m)	allow 4.0 (m)	1	6.1.1.2