Name of the Student:_____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

Question	Answer	Additional guidance	Mark
(i)	substitution (1) (work done =) 1200 × 8(.0) evaluation (1) (work done =) 9600 unit (1) J	 award two marks for the correct answer without working independent mark accept j OR joule(s) OR N m ignore n m (lower case n) accept 9.6 kJ (kilojoules) for three marks	(3) AO2.1

Question	Answer	Additional guidance	Mark
(ii)	A description to include **two** from:	ignore references to GPE	(2) AO2.1
	kinetic (energy store) (1)	KE	
	(kinetic energy store is) transferred to thermal (energy store) (1)	accept heat for thermal thermal (energy store) increases accept arrow for 'transferred to'	
	energy of the surroundings increases (1) OR energy is dissipated (to surroundings) (1)	energy is transferred to the air/ground/surroundings	

Q2.

Question number	Answer	Additional guidance	Mark
i	substitution (1)		(2)
	(E =) ½ X 20 x 0.09(2)	allow 1 mark for ½ x 20 x 9² or answer of 810 (J) or answer of 90 (J)	
	evaluation (1)		
	0.08(1) (J)	award full marks for the correct answer without working	

Question number	Answer	Additional guidance	Mark
ii	a description including mention of one relevant energy store (1) correct transfer in context (1)	 potential/ PE/ kinetic/ KE/ thermal/ heat/ elastic potential energy stored in the spring transferred to kinetic energy of the ball/rod scores 2 marks kinetic energy of rod is transferred to kinetic energy of ball scores 2 marks idea of energy transferred to the surroundings/ thermal scores 2 marks	(2)

Question number	Answer	Additional guidance	Mark
iii	an explanation linking two from (controls the maximum) extension (1) idea of keeping below the elastic limit (1) (which would result in) spring being permanently stretched (1)	ignore <u>damaging</u> the spring (given in stem) stretch prevents spring being over-stretched / extended too far scores 2 marks allow distorted/ break	(2)

Q3.

Question number	Answer	Additional guidance	Mark
(a)(i)	substitution (1) $(KE =) \dfrac{1}{2} \times 85 \times 1.5^2$ answer (1) 96 (J)	award full marks for correct numerical answer without working allow 95.625 (J)	(2)

Question number	Answer	Additional guidance	Mark
(a)(ii)	rearrange (1) force = work done ÷ distance answer (1) (force) = 15 (N)	accept rearrangement with values subst., i.e. (force) = 1200 ÷ 80 award full marks for correct numerical answer without working	(2)

Question number	Answer	Additional guidance	Mark
(b)	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark): • the work done is the same for walking and running (1) • because work done depends on force and distance only, not time (1)	 allow energy for work done because work done ÷ time is power	(2)

Question number	Answer	Additional guidance	Mark
(c)	rearrangement (1) (height) = change in GPE ÷ (mass × g) answer (1) 2.2 (m)	accept rearrangement with values, i.e. (h) = 264 ÷ (12 × 10) or = 264 ÷ 120 award full marks for correct numerical answer without working	(2)

Q4.

Question Number:	Answer	Additional guidance	Mark
	substitution (1) (KE =) ½ x 68 x 12^2 evaluation (1) 4900 (J)	½ x 68000 x 12^2 scores 1 mark accept values that round to 4900(J) e.g. 4896(J) award full marks for correct answer without working	**(2)** AO 2 1