

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

	Answer	Acceptable answers	Mark
(i)	Model A because Model A (can produce up to)7200kWh per year (at 13mph) / will produce 6000 kWh (with given wind speed). (1)	Model B produces less than 6000kWh per year at 13mph /requires wind speed of more than 13mph to produce 6000kWh	(1)
(ii)	Substitution (1) 0.14×6000 Evaluation (1) (£)840	Allow incorrect conversion of p to £ such as 0.014×6000 for 1 mark only 84 000 p correct answer with no working shown gains both marks	(2)
(iii)	Divide the installation cost by the annual saving (to find the time in years) (1)	£840 for annual saving	(1)
(iv)	A suggestion linking (energy saving lamps) would not transfer so much thermal energy (1) he may have to use additional heating / lights (which would cost money to run/ purchase) (1)	not get hot / produce so much heat reverse argument such as insufficient heat for chicks to thrive (Ignore references to light output.)	(2)

Q2.

	Answer	Acceptable answers	Mark
(a)	Description including 3 of the following: • (Gravitational)	(G)PE (transferred) to KE Allow gravitational energy for GPE	(3)

	potential energy (transferred) to KE(1) - Idea of energy transfer to heat/sound whilst descending (1) - Chemical energy is transferred to heat energy in Andrew (1) - Idea of energy dissipated on stopping (1)	Energy transferred to heat because of air resistance/ friction The energy goes to heat as he stops. Energy is transferred to the surroundings	
(b)(i)	substitution (1) 67×31 evaluation (1) 2077 (kg m/s)	2080, 2100 working backwards using 2000 (v=) 29.85, 30 (m=) 64.52, 65 $67 \times 31 = 2000$ scores only one mark	(2)
(b)(ii)	substitution (1) $2000 \div 2.3$ evaluation (1) 870 (N)	answer to (b)(i) $\div 2.3$ 900, 869.6, 869.5 903	(2)
(b)(iii)	an explanation linking two of the following - Force on Andrew is quite small (1) - Because impact time is long (1) - The acceleration/deceleration is quite small (1) - Because impact distance is far (1)	force is reduced/ less /not as strong slows down/changes momentum gradually acceleration = 1.35 'g' or 13.5 m/s^2 slows down (rate of) change of momentum scores 2 marks	(2)

Total question = 8 marks

Q3.

Question number	Answer	Additional guidance	Mark
	estimate of weight (1)	ignore reaction time	(2)
	measure (actual) weight (1)	use scales	A03
		ignore repeating measurements	