Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

Question Number:	Answer	Mark
	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative (example) content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. Indicative content • Description of an experiment which will allow work done over a given time to be measured. • E.g. running upstairs, step-ups, lifting weights • Apparatus to be used, weighing scales, known weights ruler, stop clock • Measurements to be made • E.g. weight of person/weights lifted, vertical distance moved, time taken. • Calculation of work done for each student using work done =force x distance moved in direction of force • Calculation of power for each student using power=work done/time taken Comparison of powers by lifting same weights, in a constant time and comparing the distance moved	**(6)** AO 2 2

Downloaded from www.merit-minds.com

Level	Mark	Descriptor
	0	• No awardable content
Level 1	1–2	• The plan attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. (AO2) • Analyses the scientific information but understanding and connections are flawed. An incomplete plan that provides limited synthesis of understanding. (AO3)
Level 2	3–4	• The plan is mostly supported through linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provides some logical connections between scientific enquiry, techniques and procedures. A partially completed plan that synthesises mostly relevant understanding, but not entirely coherently. (AO3)
Level 3	5–6	• The plan is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provide logical connections between scientific concepts throughout. A well-developed plan that synthesises relevant understanding coherently. (AO3)

Downloaded from www.merit-minds.com

Q2.

Question number	Answer	Additional guidance	Mark
(i)	joule(s)	J j Nm newton metre(s) kg m^2 s^{-2} kg m^2/s^2 Ignore SI prefixes do not accept nm	**(1)** **AO1**

Question number	Answer	Additional guidance	Mark
(ii)	selection of and substitution into E = F x d (1) 1960 = weight x 4.0 rearrangement and evaluation (1) (weight =) 490 (N)	accept P x t = F x d 436 x 4.5 = weight x 4.0 490.5 or 491 award full marks for the correct answer without working 530 scores 1 mark (used data to calculate median value)	**(2)** **AO2**

Downloaded from www.merit-minds.com

Question number	Answer	Additional guidance	Mark
(iii)	selection of and substitution into P = E÷t (1) 425 = 2040 ÷ t rearrangement and evaluation (1) (time =) 4.8 (s)	 0.208 scores 1 mark 867000 scores 1 mark award full marks for the correct answer without working	**(2)** **AO2**

Question number	Answer	Additional guidance	Mark
(iv)	values for power selected and added (1) $\frac{440 + 436 + 425}{(3)}$ evaluation (1) 434 (W)	 $\frac{1301}{(3)}$ accept values that round to 434 e.g. 433.667 accept 436 (median average) for 2 marks 1301 scores 1 mark 1017(.666) scores 1 mark award full marks for the correct answer without working	**(2)** **AO2**

Downloaded from www.merit-minds.com

Q3.

Question Number:	Answer	Additional guidance	Mark
	recall and substitution (1) 1600 = force x 28 rearrangement (1) (force) = $\frac{1600}{28}$ evaluation (1) 57 (N)	substitution and rearrangement in either order accept f, F or ? for force accept values that round down to 57 e.g. 57.14 award full marks for correct answer without working award 1 mark for answers of 44800 or 0.0175 **and** a correct expression relating work, force and distance	**(3)** AO 2 1

Q4.

	Answer	Acceptable answers	Mark
	C when the bungee cord is stretched the most		**(1)**

Q5.

	Answer	Acceptable answers	Mark
(a)	**C** when the bungee cord is stretched the most		**(1)**
(b)	**A** 600 kg m/s		**(1)**

Downloaded from www.merit-minds.com

(c)(i)	Substitution: (1) 60 × 10 × 50 or 600 × 50 Evaluation: (1) 30 000 Unit: (1) J / Nm	give two marks for correct answer no working j / joule 30 kJ for full marks	**(3)**
(c)(ii)	After falling 50 m / when the cord becomes straight/when cord starts to stretch	tension starting to increase at terminal velocity ignore maximum velocity/speed	**(1)**
(c)(iii)	An explanation linking any two of not all GPE is transferred to KE (1) some of the GPE transfers to thermal energy /work is done (1) due to drag (1)	not all GPE goes to KE maximum energy is same (value) as GPE before falling /speed does not reach the speed at which he should fall some lost as heat/sound (of rope or movement through air) (air) resistance / friction ignore wind	**(2)**

Downloaded from www.merit-minds.com