Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
(i)	rearrangement of work = force × distance (1) d = W ÷ F substitution and evaluation (1) 18 (m)	 d = 2700 ÷ 150 Award full marks for correct answer without working	(2)

Question number	Answer	Additional guidance	Mark
(ii)	2700 (J)		(1)

Question number	Answer	Additional guidance	Mark
(iii)	rearrangement of KE = ½ mv^2 (1) v = √(2 × KE ÷ m) substitution and evaluation (1) 19 (m/s)	 v = √(2 × 2700 ÷ 15) v^2 = (2 × 2700 ÷ 15) allow answers that round to 19 award full marks for correct answer without working allow alternative route using $v^2 - u^2 = 2ax$ for full marks	(2)

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Q2.

Question Number:	Answer	Additional guidance	Mark
		substitution and rearrangement in either order	**(3)** AO 2 1
	recall and substitution (1) 1600 = force x 28 rearrangement (1) (force) = $\frac{1600}{28}$ evaluation (1)	accept f, F or ? for force	
	57 (N)	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	

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Q3.

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**

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**

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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**

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Q4.

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

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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)

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