

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

Q1.

Question number	Answer	Additional guidance	Mark
(i)	D R and S A, B and C are incorrect because the difference in vertical positions are all less than that shown by R and S		(1) AO1
Question number	Answer	Additional guidance	Mark
(ii)	recall (1) work done = force x distance substitution and evaluation (1) (work done =) 14,000 (J)	(work done) = 700 x 20 award full marks for the correct answer without working	(2) AO1

Question number	Answer	Additional guidance	Mark
(iii)	substitution (1) $11250 = m \times 10 \times 15$ rearrangement and evaluation (1) (mass=) 75 (kg)	award full marks for the correct answer without working. if no other marks scored then award 1 mark for answers of 0.013 (substitution mark using $h = 15$)	(2) AO2

Question number	Answer	Additional guidance	Mark
(iv)	An explanation linking some work is done to overcome friction/air resistance (1) energy is dissipated /transferred to the environment (1)	allow energy is lost thermal energy	(2) AO1

Question number	Answer	Additional guidance	Mark
(v)	C increase the efficiency of the cyclist and bicycle A is incorrect because lubrication has no effect on work done against gravity B is incorrect because lubrication will increase efficiency D is incorrect because the overall energy transfer will not increase		(1) AO1

Q2.

Question Number	Answer	Mark
	The only correct answer is B: work done= force × distance moved in direction of force A is incorrect because the equation would be dimensionally inconsistent C is incorrect because the equation would be dimensionally inconsistent D is incorrect because the direction of the distance moved is incorrect	(1)

Q3.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	C - power		(1)

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	energy work	Must be in correct order	(1)

Question Number	Answer	Acceptable answers	Mark
a(iii)	Substitution 50 × 4 (1)		(2)
	Evaluation 200 (kg m/s) (1)	Allow full marks for correct answer with no working shown	

Question Number	Answer	Acceptable answers	Mark
a(iv)	Substitution 450 / 1.5 (1)		(2)
	Evaluation 300 (N) (1)	Allow full marks for correct answer with no working shown Allow (1) for 167 (N) obtained by 450-200 / 1.5	

Question Number	Answer	Acceptable answers	Mark
(a)(v)	An explanation to include (quantity has) a size and a direction	ignore any named examples	(1)

Question Number	Answer	Acceptable answers	Mark
(b)	An explanation which uses conservation of momentum to link three from Mother and daughter have different mass (1) Momentum is conserved / is zero to start with (1) Both have same size momentum (after the push) (1) so speed of the daughter is greater than that of the mother (1)	An explanation based on Newton's laws and linking three from Each have a different mass (1) Each experience the same size force / action and reaction are equal (1) Each experiences a different acceleration (1) so speed of the daughter is greater than that of the mother (1)	(3)

(Total for Question = 10 marks)