Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Mark Schemes

Q1.

Question Number	Answer	Acceptable answers	Mark
(a)	B 		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)	**A** – 0 N		**(1)**

Question Number	Answer	Acceptable answers	Mark
(c)(i)	Substitution (1) 1.2 = (20 – 13) / t Transposition (1) t = (20-13)/1.2 Evaluation 5.8 (s) (1) substitution and transposition can be in either order	1.2 = 7 / t t = 7/1.2 5.833 (etc) Give full marks for correct answer, no working	**(3)**

Question Number	Answer	Acceptable answers	Mark
(c) (ii)	Substitution 1400 x 1.2 (1) Evaluation 1700 (N) (1)	1680 Allow full marks for correct answer with no working shown	**(2)**

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Question Number	Answer	Acceptable answers	Mark
(c) (iii)	An discussion to include three of the following points The tow rope does not have to support the weight of the car (1) Tension is caused by accelerating force (plus frictional forces) (1) Tension is 5700 N (in this situation)(1) Forces could be kept below 12,000N (1) If acceleration is kept small (1) Numerical justification using f = m x a (1)	 forces are horizontal not vertical / only needs to overcome friction Force is needed to accelerate / resultant force is 0 at constant velocity Force to accelerate is 1700N Forces could be kept small If truck is driven gently/slowly	**(3)**

(Total for Question = 10 marks)

Q2.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	**A**		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	A description to include any two of • Gravitational / potential energy reduces (1) • kinetic energy increases (1) • total energy remains constant (1)	Ignore energy changes resulting from impact with sand GPE reduces KE increases Allow GPE is transferred to KE for 2 mark	**(2)**

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Question Number	Answer	Acceptable answers	Mark
(b)	A explanation linking • (work is done) displacing the sand (1) with EITHER • (as) kinetic energy of the ball(s) has been transferred (1) OR • by the force between the ball and the sand (1)	sand moving/ pushing/ blowing upwards OWTTE or ball sinking into sand	**(2)**

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Question Number	Answer	Acceptable answers	Mark
(c) (i)	transposition mass = momentum / velocity (1) substitution mass = 0.46 / 6.2 (1) evaluation 0.074 (kg) / 74g (1)	Subst. and transform. either order 1 mark only can be scored for correct substitution after incorrect transposition. Give full marks for correct answer with no working. Answers that round to 0.074 (kg) 0.07 (kg)	**(3)**

Question Number	Answer	Acceptable answers	Mark
(c)(ii)	substitution (impact) force = 0.46 / 0.17 (1) evaluation 2.7 (N) (1)	Give full marks for correct answer with no working. Ignore power of ten error until evaluation Answers which round to 2.7 Allow ECF if candidate has used mass from part (i) in F=m(v-u) / T $F = \frac{6.2 - 0}{0.17} \times 0.074$ (1) = 2.7 (N) (1)	**(2)**

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