Question Number	Answer	Acceptable answers	Mark
1(a)(i)	electrical	electric	(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	chemical		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	20 (J)	200 – 180 (even if calculated value from this is incorrect)	(1)

Question Number	Answer	Acceptable answers	Mark
1 (b) (ii)	(changed to) {thermal energy / heat}	dissipated (lost) to {surroundings / motor / air / atmosphere} sound / noise reject if kinetic, light or chemical is mentioned	(1)

Question Number	Answer		Acceptable answers	Mark
1 (b) (iii)			award full marks for correct answer with no working	(2)
	<u>180</u> × 100 200	(1)	<u>_180</u> 200	
	90 (%)	(1)	0.9, 9/10 Or [100 – (20/200)]	
			% not needed but if a unit is given then maximum score is 1	

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	D dark : rough		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	C the container is losing thermal energy at the same rate it is absorbing it	Heat for thermal Same amount in same time for same rate	(1)

Total for Question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2 (a)	kinetic (energy)	Movement (energy) KE	(1)

Question Number	Answer	Acceptable answers	Mark
2 (b)	substitution: 0.6 x 20 (1) evaluation	give 2 marks for correct answer	
	12 (1) J (1)	unit is an independent mark joules, Nm, kgm ² /s ² , Ws	(3)

Question Number	Answer		Acceptable answers	Mark
2 (c)	substitution: 0.5 x 18	(1)		
	evaluation 9.0	(1)	9	
			give full marks for correct answer no working	(2)

Questio	n	Indicative Content	Mark
Number	•		
QWC	*)	 a description including some of the following points: chemical to kinetic while in his hand kinetic (gradually) to potential while rising / from 0-10 m eventually all potential at 10 m with a little thermal (heat) energy some mention of conservation of energy potential (gradually) to kinetic as falls / 10 m-0 with a little more thermal (heat) energy at 0 m sound energy at 0 m thermal (heat) energy 	(6)
Level	0	No rewardable content	
1	1 - 2	 a limited description which identifies a change in one releving type energy or a transfer of energy from one form to anothele.g. kinetic energy increases OR kinetic energy changes sound. the answer communicates ideas using simple language and limited scientific terminology spelling, punctuation and grammar are used with limited accuracy 	ant her to d uses
2	3 - 4	 a simple description giving detail of a relevant energy change/transfer e.g. kinetic energy changes into potential as it moves upwards OR kinetic energy increases as it falls the answer communicates ideas showing some evidence of and organisation and uses scientific terminology appropria spelling, punctuation and grammar are used with some action 	energy f clarity tely curacy
3	5 - 6	 a detailed description of a sequence of relevant energy cha /transfers e.g. kinetic energy is transferred into potential e as it rises. This then changes back into kinetic energy as it back down. the answer communicates ideas clearly and coherently use range of scientific terminology accurately spelling, punctuation and grammar are used with few error 	anges energy falls es a

Question	Answer	Acceptable answers	Mark
Number			
3 (a)	C when the bungee cord is		
	stretched the most		(1)

Question	Answer	Acceptable answers	Mark
number			
3 (b)	A 600 kg m/s		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	Substitution: (1) 60 x 10 x 50 or 600 x 50		
	Evaluation: (1) 30 000	give two marks for correct answer no working	
	Unit: (1) J / Nm	j / joule 30 kJ for full marks	(3)

Question Number	Answer	Acceptable answers	Mark
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)

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	An explanation linking any two of		
	not all GPE is transferred to KE (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 {of the GPE transfers to thermal energy /work is done} (1)	some lost as heat/sound (of rope or movement through air)	
	due to drag (1)	(air) resistance / friction ignore wind	(2)

Answer	Acceptable answers	Mark
elastic potential energy		(1)
	Answer elastic potential energy	Answer Acceptable answers elastic potential energy

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	0.3(J) (1)	0.5-0.2 (J)	(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	substitution (1) 0.2÷0.5 evaluation (1) 0.4 / 40(%) / ² / ₅	Give full marks for correct answer with no working	(2)

Question	Answer	Acceptable answers	Mark
Number			
4(b)(iii)	Any two of the following		
	 thermal/heat (1) 		
	 (idea that energy is) 	Ignore transferred to	
	dissipated/spreads out (1)		
		Atmosphere/air	
	 to the surroundings (1) 		
		Accept	
		makes surroundings warmer (2)	
		Ignore lost	(2)

Question		Indicative content	Mark
Numbe	er *4(-)		
QVVC	^ 4(C)	A description including some of the following points	
		Forms of energy	
		gravitational potential energy	
		 kinetic energy 	
		elastic potential energy	
		heat(thermal) and sound	
		Location of energy	
		 gravitational potential energy of mass as it rises 	
		kinetic energy of mass as it moves	
		Elastic potential energy stored in spring	
		Heat/sound dissipated to surroundings	
		Linked ideas	
		 As the pendulum falls, gravitational potential energy 	
		changes to kinetic energy.	
		 the kinetic energy from the pendulum ends up as heat, 	
		warming the surroundings.	
		• the elastic potential energy in the clockspring becomes	
		kinetic energy of the pendulum to keep the pendulum	
		swinging.	(6)
Level	0	no rewardable material	
Level 1	0 1-	 no rewardable material a limited description including the name of one form of energ 	y that
Level 1	0 1-	 no rewardable material a limited description including the name of one form of energis involved in the pendulum swing eg. the pendulum has kine 	y that tic
Level 1	0 1-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. 	y that tic
Level 1	0 1-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology. 	y that tic ses
Level 1	0 1-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grapmar are used with limited accurate. 	y that tic ses
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accurates a simple description of the pendulum swing indicating where 	y that etic ses uracy the
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accu a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum sectors and the pendulum sectors are used with the pendulum sectors are used with	y that tic ses uracy the dulum
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accurate a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum is moving it has kinetic energy / the pendulum is high at the 	y that etic ses <u>uracy</u> the dulum side of
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accurate energy can be found OR a simple transfer eg. When the pendulum is high at the the swing so it has gravitational potential energy / As the 	y that etic ses <u>uracy</u> the dulum side of
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accurate a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char 	y that stic ses <u>uracy</u> the dulum side of
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accuration of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. 	y that etic ses <u>uracy</u> the dulum side of nges to
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accuration of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of classical energy and use a simple showing some evidence of classical energy and use a simple specific to PE. 	y that stic ses <u>uracy</u> the dulum side of nges to arity
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accu a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum swing it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately. 	y that etic ses <u>uracy</u> the dulum side of nges to arity y
Level 1 2	0 1- 3-	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accu a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accur 	y that etic ses <u>uracy</u> the dulum side of nges to arity y racy
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accu a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pend is moving it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accur a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place equivalent to the source of the spelling of the pendulum success of the scientific terminology appropriately spelling, punctuation and grammar are used with some accur 	y that etic ses <u>uracy</u> the dulum side of nges to arity y racy the as the
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accure a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum swing it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately. spelling, punctuation and grammar are used with some accure a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy char 	y that etic ses <u>uracy</u> the dulum side of nges to arity y acy the as the nanges
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accure a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum swings it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately. spelling, punctuation and grammar are used with some accure a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy char heat and some scientific energy is dissipated as heat and some accured is a simple description of an energy transfer indicating where energy can be found and where the transfer takes place eg. The pendulum swings to and fro, gravitational potential energy charter is descripted as heat and some energy is dissipated as heat and some energ	y that stic ses <u>uracy</u> the dulum side of nges to arity y acy the as the nanges bund to
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energy is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accure a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pendulum swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately. a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy char be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy char be found and set and so the surroundings 	y that etic ses <u>uracy</u> the dulum side of nges to arity y racy the as the nanges pund to
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energ is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accur a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pend is moving it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accur a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy ch to kinetic energy / kinetic energy is dissipated as heat and so the surroundings the answer communicates ideas clearly and coherently uses a 	y that stic ses <u>uracy</u> the dulum side of nges to arity y acy the as the nanges bund to
Level 1 2 3	0 1- 3- 5 - 6	 no rewardable material a limited description including the name of one form of energ is involved in the pendulum swing eg. the pendulum has kine energy. the answer communicates ideas using simple language and u limited scientific terminology spelling, punctuation and grammar are used with limited accur a simple description of the pendulum swing indicating where energy can be found OR a simple transfer eg. When the pend is moving it has kinetic energy / the pendulum is high at the the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy char potential energy / KE to PE. the answer communicates ideas showing some evidence of cl and organisation and uses scientific terminology appropriately. spelling, punctuation and grammar are used with some accur a detailed description of an energy transfer indicating where energy can be found and where the transfer takes place eg. pendulum swings to and fro, gravitational potential energy ch to kinetic energy / kinetic energy is dissipated as heat and so the surroundings the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately 	y that etic ses <u>uracy</u> the dulum side of nges to arity y racy the as the nanges bund to

Question	Answer	Acceptable answers	Mark
Number			
5 (a)	А		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	both points correctly plotted (1)	allow +/- half square	(1)

Question	Answer	Acceptable answers	Mark
Indumber			-
5(b)(ii)	smooth curve (1)	allow slight discontinuities/double	
	(does not need to go through all	lines/ thick lines	
	section)	NOT dot to dot /two straight lines	(1)

Question	Answer	Acceptable answers	Mark
Number			
5(b)(iii)	temperature from 34 °C to 39 °C inclusive (1)		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(iv)	21(°C) (1)	22(°C)/23(°C)	(1)

Question Number	Answer	Acceptable answers	Mark
5(c)(i)	it/black is a good absorber of heat /energy/radiation/IR (1) i.e. it absorbs/takes in more infrared/IR	allow it/black absorbs/takes in heat ignore attracts/emitter/conductor NOT (so it) cools down quickly	(1)

Question Number	Answer	Acceptable answers	Mark
5(c)(ii)	substitution (1) 9000 ÷ 20 evaluation (1)	ignore powers of 10 until evaluation e.g. 90 ÷ 2 gains 1 mark	
	450 (W)	45 gains 1 mark give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
5(c)(iii)	substitution (1)	ignore powers of 10 until evaluation	
	9000 ÷ 18 000 (x 100%)	a a 00.000 · 1800 asing 1 morts	
	evaluation (1)	5 gains 1 mark	
	50 (%)	0.5 or ½ or half gains both marks	
		give full marks for correct answer, no working	
			(2)