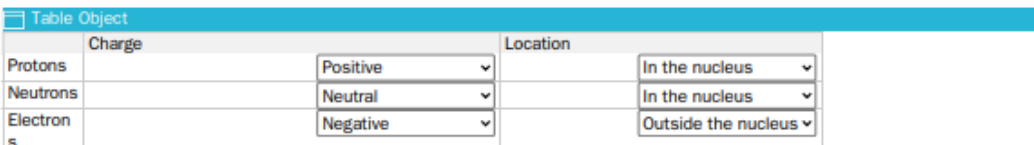


Question		Answers	Notes	Total	Crit
1	a	Ant		1	A
	b	Oxygen <i>and</i> glucose	<i>Accept any order</i>	1	A
	c	<i>Sticky tongue:</i> Allows it to eat ants or catch the prey <i>Sharp claws:</i> Allow it to dig into ground to find ants or to defend itself against the hyena	<i>WTTE</i>	2	A
	d	20-40 (seconds)		1	A
	e	Gradient calculation seen or implied Speed= 12 (ms ⁻¹) Final answer = 43(.2) (km h ⁻¹)	<i>Award 3 marks if 43 or 43.2 is seen with no calculation</i>	3	A
2	a	Group 7 <i>or</i> the halogens	<i>Accept group 17</i>	1	A
	b	6		1	A
	c	Synthesis of proteins		1	A
	d	Cell wall acts as a barrier <i>or</i> protective layer <i>or</i> protection (so) when it is damaged chemicals can enter (and disrupt cell functions)	<i>WTTE</i>	2	A
	e	Third law of motion <i>Justification:</i> Person exerts a downward force on board by jumping Board exerts an equal and opposite <i>or</i> upwards force on the person to push the person away	<i>Second and third marks do not depend on the first mark</i> <i>WTTE</i>	3	A
	f	10 (N) Forwards <i>or</i> to the right <i>or</i> in the direction of 130N		2	A

3	a	Efficiency of incandescent 10 (%) Efficiency of LED 75(%)		2	A
	b	<p>First mark: Two correct physical properties, for example</p> <ul style="list-style-type: none"> • tungsten is a metal • argon is a non-metal • tungsten has a high melting point • argon has a low melting point • tungsten conducts electricity or heat • argon does not conduct electricity or heat • tungsten is a solid at room or normal or working temperature • argon is a gas at room or normal or working temperature <p>Second mark: a further <u>two</u> correct physical properties from the list above</p>	<i>Allow a maximum of two properties for each element seen in any box</i>	2	A
	c	It is unreactive or has low reactivity or prevents burning or prevents corrosion or is stable	<i>Do not accept it is a noble gas</i>	1	A
	d	 <p>Charges all correct</p> <p>Locations all correct</p>		2	A
	e	So that each light bulb works independently or So they all get the same voltage	<i>WTTE</i>	1	A

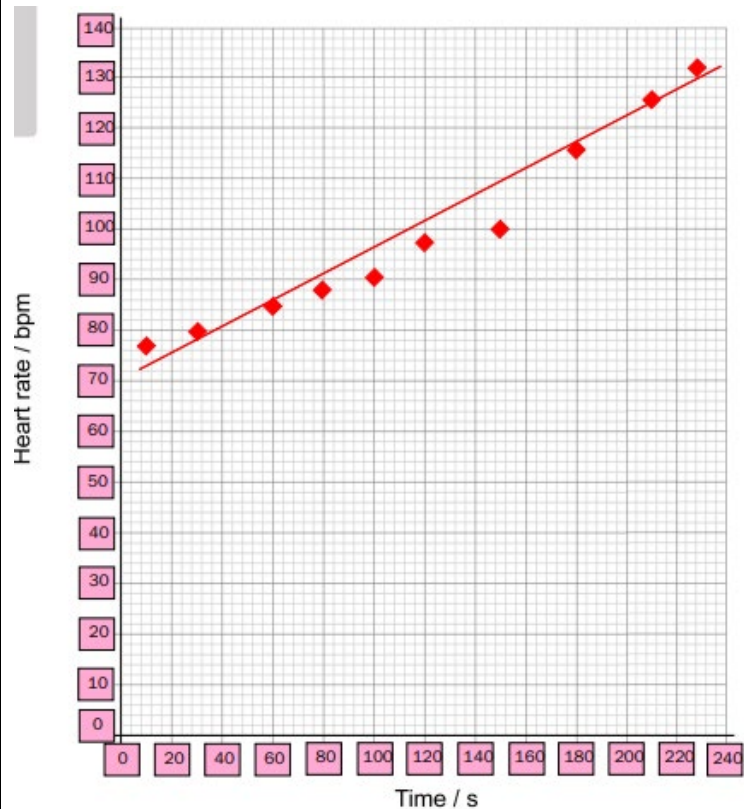
4	a	<p>input energy at the bottom of the slope → output energy at the top of the slope</p> <p> Electrical energy Gravitational potential energy </p> <p>Electrical energy</p> <p>Gravitational potential energy</p>		2	A																						
	b	<p>How does changing the angle (of the slope) affect the kinetic energy (of the ball or skier at the bottom of the slope)</p>	<i>Do not accept speed</i>	1	B																						
	c	<p>IV: Angle (of the slope)</p> <p>DV: Kinetic energy</p>		2	B																						
	d	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #00a0c0; color: white;"> <th colspan="2">Table Object</th> </tr> <tr> <th style="text-align: left;">Angle / degrees</th> <th style="text-align: left;">Kinetic energy / J</th> </tr> </thead> <tbody> <tr><td>5</td><td>0.003</td></tr> <tr><td>7</td><td>0.005</td></tr> <tr><td>10</td><td>0.007</td></tr> <tr><td>12</td><td>0.008</td></tr> <tr><td>15</td><td>0.010</td></tr> <tr><td>19</td><td>0.012</td></tr> <tr><td>20</td><td>0.013</td></tr> <tr><td>25</td><td>0.017</td></tr> <tr><td>30</td><td>0.021</td></tr> </tbody> </table> <p>Columns for angle and kinetic energy</p> <p>Correct units in header only degrees and J</p> <p>Five readings or more</p> <p>Minimum angle 5 degrees and maximum angle 30 degrees</p>	Table Object		Angle / degrees	Kinetic energy / J	5	0.003	7	0.005	10	0.007	12	0.008	15	0.010	19	0.012	20	0.013	25	0.017	30	0.021	<i>Accept data arranged in rows</i>	4	C
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e	<p>Use of at least two data points</p> <p>As the angle increases, the energy at the bottom increases also</p> <p>So therefore the hypothesis is invalid</p>	<i>Award marking point 3 only if marking point 1 or marking point 2 is awarded</i>	3	C																							

f	<p>Accept any two reasonable comments, for example [max 2]</p> <ul style="list-style-type: none"> • weather conditions would be different on ski slope • variables would be more difficult to control on a ski slope • surface of the slope would vary in real life • the angle of a mountain is fixed • the data collected was appropriate to model the movement of the skier 	WTTE	2	C
g	<p>Accept any reasonable improvement, for example [max 1]</p> <ul style="list-style-type: none"> • use ice or different surface • use a fan • change temperature <p>Accept any correctly linked justification, for example [max 1]</p> <ul style="list-style-type: none"> • (use ice) this is closer to the friction of a snow slope • (use a fan) this mimics the wind when skiing down a slope • (change temperature) the temperature affects the behaviour of the snow 		2	C

5					15	B	
		1 mark	2 marks	3 marks			4 marks
	1.V	IV as height or DV as speed identified	IV identified as height and DV identified as speed	IV identified as height and DV identified as speed and at least 1 CV identified			IV identified as height and DV identified as speed and at least 2 CV identified
	2.RQ	RQ includes one variable only	RQ links an IV and DV				
	3.E	Some additional equipment mentioned but may not be relevant	Measuring tape (ruler) to measure IV or Equipment to control or monitor one stated CV	Measuring tape (ruler) to measure height and Equipment to control or monitor one stated CV			
	4.M	Attempt at a method but detail is insufficient to follow	Method can be followed but detail is incomplete or incorrect	Complete method to vary height is described, fully explained and can be followed			
5.D	Method includes 5 values of IV or 3 trials	Method includes 5 values of IV and 3 trials	Method includes 5 values of IV and with 3 trials and plans to calculate average				

6	a	<p>Accept any two reasonable CV, for example [max 2]</p> <ul style="list-style-type: none"> • the same runner • the speed of the runner • the angle of the treadmill • speed of the treadmill <p>Accept any correctly linked justification, for example [max 2]</p> <ul style="list-style-type: none"> • health of cardiovascular system changes with age, sex, health status • the faster the runner is moving, the higher the heart rate • the greater the angle, the higher the intensity of exercise or heart rate • running at different speeds, different amount of effort 	<p><i>Do not accept length of time exercising as this is the IV</i></p> <p><i>Accept any link to change in exercise intensity</i></p>	4	B
	b	<p>131.67</p> <p>132</p>	<p><i>Award 2 marks for final correct answer</i></p>	2	C

c



X axis scale has numbers at equal increments and starts at zero with plotted points taking up at least half of the graph

Y axis scale has numbers at equal increments and starts at any point below 77 (the y-intercept)

Five points plotted correctly

All points plotted correctly

Best fit line roughly going through all or most points (ignore anomalous point at 150s)

5

C

	d	At 150 seconds (trial 2) Reasons: water break, rest, human error...	<i>Award marking point 2 only if marking point 1 is awarded</i>	2	C
	e	This is because there is an increased demand for oxygen in the body or muscles or ATP production or for energy demand (for cellular) respiration	<i>WTTE</i>	2	C

7	a	Accept any possible effect of increased or decreased global temperature, for example [max 1] <ul style="list-style-type: none"> • reduce crop yields or decrease in amount of food supply • change or migration of species • soil erosion and depletion of nutrients • loss of agricultural land • harvesting calendars may change Accept any correctly linked justification [max 1]		2	D
	b	Accept any two reasonable advantages, for example [max 2] <ul style="list-style-type: none"> • less groundwater pollution • can be done at home/small portions of land • less harmful effect on animals • crop spraying not needed so air pollution is lower • soil preservation Accept any two reasonable limitations, for example [max 2] <ul style="list-style-type: none"> • higher price • time-consuming • standards high to meet • government offices need to approve for large-scale production • development of pests due since no pesticides • depends on weather conditions 	<i>Accept answers in any box</i> <i>Do not accept: no pesticides, no synthetic fertilizers, no antibiotics or no hormones are not used as this information is in the question</i> <i>Do not accept a lower amount of food is produced, lower yield or requires larger areas as this information is in the question</i>	4	D

c		1 mark	2 marks	3 marks	6	D
	Benefits of a plant-based diet	one benefit for the body	two benefits for the body or one benefit with further support	two benefits for the body and at least one of them fully supported		
	Limitations of a plant-based diet	one limitation for the body	two limitations for the body or one limitation with further support	two limitations for the body and at least one of them fully supported		

8	a	<p>Accept any two reasonable suggestions, for example [max 2]</p> <ul style="list-style-type: none"> • efficiency • monitors all fish farming processes (feeding, reproduction, size) • measuring levels of chemicals • pumping • aeration • reduce physical labour 				2	D																								
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