



Question number	Answer	Notes	Marks
2(a)	<p>S scale linear and half grid used for plotting;</p> <p>L lines straight and through points;</p> <p>A axis correct way + units for <u>energy in kJ</u>;</p> <p>P points plotted correctly;</p> <p>K key;</p>	<p>If not linear lose S and P</p> <p>Histogram means lose S and L for Max 3</p> <p>Line to origin means lose L</p>	5
(b)	<p>1. increases energy requirement / eq;</p> <p>2. decreases <u>from 25</u>;</p>	<p>Increases up to a point and then decreases = 1</p> <p>Decrease/level off at 41 = 0</p>	2
(c)	<p>1. (more) muscle <u>contraction</u>;</p> <p>2. (more) respiration;</p> <p>3. (more) energy/kilojoules required;</p> <p>4. (more) food / glucose required / eq;</p>	<p>Allow converse</p> <p>More energy for respiration = 2</p> <p>Ignore reference to age</p> <p>3. Allow calories</p>	3

**Total 10 marks**

Question number	Answer	Notes	Marks
3 (a)	smaller surface area to volume ratio; less heat loss / more energy measured / eq; heats up slowly / avoid boiling / eq;	accept converse	2
(b)	insulation / lid / cover / eq; less heat/energy loss; burning food close to tube / eq; less heat/energy loss; quick transfer of burning food / eq; less heat/energy loss; stir / eq; even temperature; avoid draft / wind; less heat/energy loss; digital thermometer ; precision / eq; use calorimeter / burn in oxygen; all food burnt / less heat/energy loss;	mark in discrete pairs reject idea of more bread ignore repeat	2
<b>Total</b>			<b>4</b>

Question number	Answer	Notes	Marks
4 (a)	within range of 1.7 to 1.8;;  allow one for 16 in working;		2
(b)	(different) gender; (different) body size / mass ; (different) age;  reason for differences in sweat production: eg hydration levels / (different) genes / (different) body temperature / metabolic rate / fitness / eq;  human error / error described;  (different) size of cotton wool / area in contact / placing / cotton wool moved / eq;  time delay before weighing;	ignore ref to clothing / environment / antiperspirant / intensity of exercise	2
(c)	A;		1

(d)	(i)	more sweat / more perspiration / more evaporation ;  need to cool / maintain body temperature / thermoregulation / thermoregulatory centre / hypothalamus eq;	must give idea of more	2
	(ii)	less evaporation / sweat can not disperse / eq; cannot cool / overheating / eq; more sweat;		max 2

**TOTAL 9 MARKS**

Question number	Answer	Notes	Marks
5 (a) (i)	107:1 / 107 to 1;	Ignore 107 alone	1
(ii)	1. no/less oxygen; 2. respiration / energy / ATP; 3. active transport / active uptake;		3
(b)	chlorophyll; amino acid / protein / peptide / polypeptide / DNA / RNA / nucleic acid;	Ignore chloroplast	2



Question number	Answer	Notes	Marks
7	1. magnesium; 2. chlorophyll / chloroplasts;  3. nitrate; 4. amino acids / proteins / DNA / genetic material;  5. minerals / ions / salts / other named mineral / fertiliser / eq; 6. (sun)light; 7. carbon dioxide; 8. warmth / temperature / eq; 9. enzymes;	ignore nutrients / water / pH / oxygen / herbivores  NPK = 0 NPK fertiliser = 1  nitrogen for amino acids = 1	5

(Total for Question = 5 marks)



Question number	Answer	Notes	Marks								
8 (a)	(i)	changed (by scientist) / altered (by student) / variable that is changed / eq;	1								
	(ii)	volume of water (collected) / water in cm <sup>3</sup> ;	allow amount of water 1 ignore time taken / variable that is measured / volume of water added								
	(iii)	<table border="1"> <thead> <tr> <th>Variable</th> <th></th> </tr> </thead> <tbody> <tr> <td>mass of dry soil</td> <td>✓</td> </tr> <tr> <td>size of measuring cylinder</td> <td></td> </tr> <tr> <td>volume of water collected</td> <td></td> </tr> </tbody> </table>	Variable		mass of dry soil	✓	size of measuring cylinder		volume of water collected		1
	Variable										
	mass of dry soil	✓									
size of measuring cylinder											
volume of water collected											
(iv)	7.1(428) / 7.14 / 7.143;	allow one mark for 7.142 or 14 in working	2								
(v)	(A) (more) decimal places / hundredths / smaller scale interval / eq;	ignore milliseconds ignore digital ignore split seconds	1								
(b)	(i)	less water / water drains away / eq; less anchorage / eq;	ignore mineral ions 2								
	(ii)	(less) oxygen / not aerobic; active transport / active uptake; respiration / energy / ATP;	ignore ref to mineral ion or water concentration gradient or waterlogged max 2								
		<b>Total</b>	10								