Question number	Answer	Notes	Marks
1 (a)	1. eat (more) plants / eats grass / eq; 2. food difficult to digest / less food digested / break down less food / food egested / eq; 3. cellulose;	allow converse for fish	2
(b)	1. re cells / bigger; 2. at loss; 3. u more energy in movement;	3. igno move more	1
(c)	1. keep indoors; 2. less heat loss / maintain body temperature / less energy loss / keep warm; OR 3. restrict movement / eq; 4. less respiration / less energy used; OR 5. more digestible food / food with more energy / food with more fat; 6. more energy absorbed;		4

Total 7 marks

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

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
6	1. phagocytes; 2. enzymes / named digestive enzyme; 3. lymphocytes; 4. clot; 5. blood loss / bleeding; 6. bacteria / microorganisms / microbes / viruses / pathogens;	Mp 1 allow macrophage Mp 5 ignore infection	6

Total 6 marks

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^3;	allow amount of water ignore time taken / variable that is measured / volume of water added	1
(iii)	<table><tr><th>Variable</th><th></th></tr><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></table>		1
(iv)	7.1(428) / 7.14 / 7.143;	allow one mark for 7.142 or 14 in working	2
(v)	(A) (more) decimal places / hundr hs / 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
		Total	10