

Question number	Answer	Notes	Marks
1 (a)	$6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ ;;	unbalanced but correct =1 eg $\text{CO}_2 + \text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$ ; words alone = 0	2
(b) (i)	1. turn off Bunsen / use water bath / eq; 2. ethanol is flammable / eq; OR 3. wear goggles; 4. protect eye; OR 5. use forceps / tongs; 6. protect fingers / skin;	ignore gloves / protective clothing	2
(ii)	kill leaf / stop digestion / stop chemical reactions; denature enzymes;	ignore wax removal / soften leaf	1
(iii)	1. remove chlorophyll / remove green (pigment) / remove colour / to see colour of iodine; 2. allow remove waxy cuticle;	ignore remove chloroplasts / destroy chlorophyll	1

(c)(i)	1. p ce one leaf in light / no cover of leaf; 2. p ce one leaf in dark / cover part of leaf;	2. use of stencil / tape	2
(ii)	1. u variegated leaf / eq; 2. dr pattern of chlorophyll and compare results / test white and green parts / eq;		2
(iii)	1. NaOH / soda lime / KOH; 2. sorb / remove carbon dioxide / eq;		2

Total 12 marks

Question number	Answer	Notes	Marks
2	large surface area; thin (leaf); upper epidermis / cuticle; transparent / lets light through; chloroplasts / chlorophyll; palisade (mesophyll); close to surface; absorb <u>light</u> ; spongy (mesophyll); diffusion; stomata / guard cells; carbon dioxide; xylem; water; ignore if transpired	mark points independently  allow carbon dioxide and water if given in an equation	max 6

**TOTAL 6 MARKS**

Question number	Answer	Notes	Marks
3 (a) (i)	<p>named ion; eg. nitrate / magnesium / phosphate / sulphate / iron / potassium / calcium</p> <p>use of ion;</p>	<p>eg. nitrate for amino acids / protein / nucleic acid / eq</p> <p>allow Mg and chloroplast</p> <p>allow symbols</p> <p>ignore nitrogen / copper</p>	2
(b) (i)	<p>S – scale linear and half grid in one direction;</p> <p>L – line straight and through points;</p> <p>A1 – axes correct way round;</p> <p>A2 – axes labelled (days and number/leaves);</p> <p>P – points plotted accurately;</p> <p>K – key;</p>	<p>if leaves plot as zero for day 0 lose P but allow L</p> <p>if leaves plot as 10 for day 0 allow P and L</p>	6
(ii)	<p>light;</p> <p>temperature;</p> <p>carbon dioxide;</p> <p>pH;</p> <p>humidity; ignore water wind;</p>	<p>ignore ref to plant</p>	max 3

**TOTAL 11 MARKS**

Question number	Answer	Notes	Marks
4 (a)	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ ; ; $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 = 1$	<p>correct formula equation for photosynthesis = 1</p> <p>if this formula equation is correctly balanced = 2</p> <p>accept CO2 reject CO<sup>2</sup></p> <p>word equation = 0 respiration = 0</p>	2

(b)	(i)	<p>Two from:</p> <ol style="list-style-type: none"> <li>1. temperature</li> <li>2. light (intensity)</li> <li>3. carbon dioxide / CO<sub>2</sub>;</li> </ol> <p>Then:</p> <ol style="list-style-type: none"> <li>4. indication of level of abiotic factor during the day;</li> <li>5. stated effect on rate of photosynthesis;</li> </ol>		Max 4
	(ii)	<ol style="list-style-type: none"> <li>1. less <u>photosynthesis</u>;</li> <li>2. (more) transpiration / evaporation / loss of water / eq;</li> <li>3. wilt / loss of turgor / stomata close / less mineral ion transport;</li> <li>4. less carbon dioxide uptake;</li> <li>5. enzymes denature / change in shape of active site / eq;</li> </ol>	<ol style="list-style-type: none"> <li>1. ignore less respiration</li> <li>4. ignore gas exchange</li> </ol>	Max 4

Question number	Answer	Notes	Marks
5(a)	1. scale linear for numbers on y axis and uses half grid; 2. x axis labelled year(s) or 1969-73; 3. y axis labelled number of heart attacks; 4. units as per 100 000; 5. plotted correctly; 6. y for men and women;	Line graph lose 1 for plotting  Allow Mps 1, 2 and 3 if plotted horizontally	6
(b)	men higher / women lower / eq;  men decreased / little change in women / women increased in recent years / women fluctuate / eq;		2
(c)	less smoking / less fat in diet / less alcohol / less salt / more exercise / eq;	Ignore better healthcare / medicine / education / alone  Ignore stress  eat more healthily = 0  Allow more aware of effects of smoking	1

(d)	<ol style="list-style-type: none"><li>1. ss oxygen;</li><li>2. ss (aerobic) respiration;</li><li>3. <u>anaerob</u> respiration;</li><li>4. ctic acid / low pH;</li><li>5. enzy s denatured;</li></ol>	Ignore glucose	max 3
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Total 12 marks