

Question number	Answer	Notes	Marks
1 (a) (i)	1. (flask X) red / orange; 2. (flask Y) yellow;		2
(ii)	(more) carbon dioxide (in flask Y) / carbon dioxide produced;	ignore colour eg. goes purple because of CO ₂ = 1	1
(b) (i)	1. colour change faster for small hamster / takes less time for small hamster / eq; 2. more respiration with small hamster / faster production of carbon dioxide / eq; 3. larger surface area to volume / loses <u>more</u> heat maintain body temperature / eq;	allow converse	2
(ii)	1. <u>optimum</u> temperature; 2. enzymes;	2. reject if enzymes die	2
(c) (i)	only one reading / not repeated / not enough results / only one hamster of each size used / eq;		1
(ii)	difficult to tell when colour changes / eq;	ignore gas escape / loose bung	1

(d)	1. age / species / type; 2. temperature; 3. volume of indicator; 4. concentration of indicator;	mark first three answers 3 and 4 ignore amount ignore activity / size of bell jar	3
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Total 12 marks

Question number	Answer	Notes	Marks
2(a)	1. smoking; 2. dust / asbestos / working in mines; 3. fumes; 4. genetic / lack of A1T; 5. bronchitis;	Ignore infection	2
(b)	1. digest / breakdown / kill / destroy; 2. bacteria / pathogens / viruses/ microorganisms; 3. prevent infection/disease/reproduction;		2
(c)	2 268 000;;	1 mark for 0.80 / 80% / $80 \div 100$ / divide by 10 multiply by 8	2
(d)	(i) alveoli / alveolus; (ii) 1. less surface area; 2. <u>diffusion</u> / gas <u>exchange</u> ; 3. (insufficient) oxygen;	Mark first answer in a list	1 2

Question number	Answer	Notes	Marks
(e)	1. <u>memory</u> cells; 2. antibodies; 3. (production and response) sooner / quickly / faster / more /last longer / eq;	2. Allow if production by incorrect cell 3. Ignore more robust / more powerful	2
(f)	(i) 1. less mucus / digests mucus / breaks down mucus / thinner mucus / runny mucus; 2. wider airways/tubes / more space / less blockage / open up /eq; 3. more air / more oxygen; (ii) 1. increases concentration of oxygen / increases concentration gradient / more oxygen; 2. (more) diffusion / (faster) diffusion / (more) gas exchange;	2. Ignore easier to breath 3. Allow more oxygen into blood Greater diffusion gradient = 2	2

Total 15 marks

Question number	Answer	Notes	Marks
3 (a)	light (intensity); affects/alters/increases/decreases/changes CO ₂ level / gas exchange / photosynthesis;		2
(b)	size / species of leaves / eq; volume/amount/concentration of indicator; temperature;	ignore ref to tube size / time / cork seal / humidity	max 2
(c)	control / allow (valid) comparison / see if indicator changes (with no leaf) / colour change due to leaf / see if gas exchange happens without the leaf / eq;		1
(d) (i)	photosynthesis / allow photosynthesis more than respiration; less CO ₂ / CO ₂ absorbed / eq;	ignore photosynthesis and respiration unqualified ignore ref to pH	2
(d) (ii)	respiration / <u>no</u> photosynthesis; CO ₂ released / more CO ₂ / no CO ₂ absorbed / eq;	ignore ref pH	2
(e) (i)	respiration equals photosynthesis / CO ₂ in equals CO ₂ out / eq;	ignore gas exchange	1
(e) (ii)	<u>no leaf</u> ;	ignore empty tube / nothing in tube	1
(f)	limewater only shows increase in CO ₂ / cannot show decrease in CO ₂ / cannot show amount of CO ₂ / eq;		1

Question number	Answer	Notes	Marks
4 (a)	1. <u>at low light / up to A</u> carbon dioxide released; 2. carbon dioxide absorbed; 3. levels off / flattens / plateaus / stays constant / <u>light</u> no longer limiting factor;		2 max
(b)	<u>respiration</u> = <u>photosynthesis</u> ;		1
(c)	1. hydrogen-carbonate (indicator); 2. yellow in dark / yellow more CO ₂ / yellow release of CO ₂ ; OR red/purple in light / red/purple less CO ₂ / red/purple absorption of CO ₂ ;	Mp 1 ignore other indicators Mp 2 ignore other colours Mp 2 correct for light but incorrect for CO ₂ = 0	2 max

Total 5 marks

Question number	Answer	Notes	Marks
5	<ol style="list-style-type: none">1. emphysema;2. less surface area / damage to alveoli /less alveoli / eq;3. bronchitis / obstructive lung disease;4. bacteria / infection;5. cilia damaged / cilia stop moving / eq;6. <u>more</u> mucus / <u>build up</u> of mucus / eq;7. cancer / carcinogens / mutation;8. tar		Max 5

Total 5 marks