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 enzy s 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

Total 12 marks

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

Question number	Answer	Notes	Marks
(e)	1. memory cells; 2. an bodies; 3. (production nd 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. le mucus / digests mucus / breaks down mucus / thinner mucus / runny mucus; 2. wider airways/tubes / more space / less blockage / open up / eq; 3. ore air / more oxygen;	 2. Ignore easier to breath 3. Allow more oxygen into blood	2 2
(ii)	1. increases concentration of oxygen / increases concentration gradient / more oxygen; 2. (more) diffusion / (faster) diffusion / (more) gas exchange;	Greater diffusion gradient = 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;	ignore photosynthesis and respiration unqualified	2
	less CO_2 / CO_2 absorbed / eq;	ignore ref to pH	
(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
(ii)	<u>no leaf</u>;	ignor 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

TOTAL 12 MARKS

Question number	Answer	Notes	Marks
4 (a)	1. at low light / up to A carbon dioxide released; 2. carbon dioxide absorbed; 3. levels off / flattens / plateaus / stays constant / light no longer limiting factor;		2 max
(b)	respiration = photosynthesis;		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	1. emphysema; 2. les surface area / damage to alveoli / less alveoli / eq; 3. br chitis / obstructive lung disease; 4. bacteria / infection; 5. cilia damaged / cili stop moving / eq; 6. re mucus / build up of mucus / eq; 7. c cer / carcinogens / mutation; 8. ta		Max 5

Total 5 marks