



Question number	Answer	Notes	Marks
1 (a) (i)	correct reference to <u>oxygen</u> + <u>carbon dioxide</u> ;		1
(ii)	1. large (surface) area; 2. thin / eq; 3. blood supply / capillaries; 4. permeable;	Ignore thin cell <u>walls</u>	max 3



Question number	Answer	Notes	Marks
1 (b) (i)	S – scale linear; L – straight and through points; A – correct way; A – labelled (breathing rate) <u>per minute</u> / (breaths) <u>per minute</u> + °C; P – points plotted accurately;	Ignore extrapolation	5
(ii)	breathing rate higher (in warmer water) / mouth opens more often (at higher temperature) / eq;		1
(iii)	different size may need different amount of oxygen / bigger fish may need more oxygen / different size may have different breathing rates / eq;	Ignore idea of fair test	1
(iv)	1. species / type / eq; 2. age 3. gender; 4. oxygen level / volume of water / size of tank / number of fish / source of water / light;	Ignore time / size of fish / type of tank / food	max 2
			Total 13 Marks



Question number	Answer	Notes	Marks
2 (a) (i)	trachea / wind pipe / cartilage; alveoli / alveolus / air sacs;	reject air pockets	2
(b) (i)	X - oxygen / O <sub>2</sub> ; Y - carbon dioxide / CO <sub>2</sub> ;		2
(ii)	8.4;		1
(iii)	B diffusion;		1
		Total	6

Question number	Answer	Notes	Marks
3(a)	<p>A (right) lung(s) / <u>intercostal</u> muscle(s);</p> <p>B rib(s) / rib cage;</p> <p>C heart;</p> <p>D diaphragm;</p>	Allow diaphragm	4
(b)	<p>1. diaphragm/D <u>contracts</u>;</p> <p>2. moves down / flattens / eq;</p> <p>3. ribcage/B moves up/out / eq;</p> <p>4. increase in (thorax) volume;</p> <p>5. decrease in (thorax) pressure;</p>	Mp3 Allow ribcage expand / ribs expand	5 max
(c)(i)	<p>1. Ff and Ff;</p> <p>2. FF and Ff and Ff and ff;</p>	<p>Allow TE for children</p> <p>Allow ecf for 1 mark if parents wrong</p>	2
(ii)	<p>1. bacteria / pathogens / microorganisms / microbes;</p> <p>2. reproduce / multiply / grow / feed / divide / eq;</p> <p>3. remain in lung / cannot be removed / eq;</p>	Mp1 ignore germs	2



(iii)	1. less air / oxygen / gas; 2. to alveoli / air sacs;		2
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Total 15 marks



Question number	Answer	Notes	Marks
4 (a) (i)	250 000;		1
(ii)	32;; allow one mark for 80 000 in working		2
(b)	1. rare / random; 2. change / damage / eq; 3. DNA / gene / allele / genetic code / eq;	random change in cells =2	2
(c)	1. less surface area; 2. slower diffusion / less diffusion / less gas exchange; 3. less oxygen / less carbon dioxide;	ignore less room  allow converse for X	2
(d)	1. blocked / narrowed / clogged / eq; 2. <u>coronary artery</u> ; 3. lot; 4. at / cholesterol; 5. less blood <u>to heart</u> ; 6. less oxygen / less oxygenated; 7. <u>muscle</u> (cells); 8. less respiration / anaerobic respiration; 9. lactic acid / angina; 10. heart attack / heart stops / cardiac arrest / eq;		5

(Total for Question = 12 marks)