MARK SCHEME – Breathing and Gas Exchange

Year 9 Biology | Total: 45 marks

A semicolon (;) separates marking points. **allow** = accept this answer; **do not allow** = do not give credit. Accept any other correct scientific answer.

Q	Answer	Marks	Guidance
1	A trachea; B bronchus; C lung; D alveoli; E bronchiole; F diaphragm	6	1 mark each. Accept windpipe for A. Accept air sacs for D
2	trachea; bronchi; bronchioles; alveoli	4	In this order. oesophagus not used
3(a)	keeps the trachea open / stops it collapsing	1	allow: holds it in shape so air can pass
3(b)	mucus traps dust / dirt / microbes; cilia sweep (beat) the mucus up and away from the lungs (to the throat)	2	do not allow: cilia kill microbes
3(c)	intercostal muscles	1	
4	Intercostal muscles: contract | relax; Ribs: move up and out | move down and in; Volume: increases | decreases; Pressure: decreases | increases	4	1 mark per row; both cells must be correct for the mark
5(a)	lungs	1	
5(b)	diaphragm	1	
5(c)	balloons inflate / get bigger; volume inside the jar increases; pressure inside the jar decreases so air moves in (from outside)	3	allow: pressure lower than outside
5(d)	any one: real chest has ribs / intercostal muscles; the bell jar walls cannot move; real diaphragm moves up when it relaxes; lungs are not separate balloons with air around them	1	any sensible difference
6(a)	12 (breaths per minute)	1	
6(b)	muscles need more oxygen (for respiration) / more carbon dioxide to remove	1	allow: to release more energy
7(a)	oxygen	1	
7(b)	carbon dioxide	1	
7(c)	diffusion	1	do not allow: respiration
8	Any three pairs: large surface area ; so more gas can diffuse at once / thin walls (one cell thick) ; short diffusion distance / moist lining ; gases dissolve before diffusing / good blood supply (many capillaries) ; keeps concentration gradient high	6	1 mark for each adaptation and 1 for its matching explanation
9(a)	oxygen	1	
9(b)	100 (times)	1	4 / 0.04 = 100
9(c)	oxygen is used up / taken into the blood for respiration; carbon dioxide is produced by respiration (and breathed out)	2	
9(d)	exhaled air	1	
10(a)	cilia cannot move / sweep mucus away; so mucus (and dirt) builds up and has to be coughed up	2	

10(b)	less oxygen reaches the muscles (for respiration); so the smoker breathes faster / harder to get more oxygen	2	allow: less energy released
10(c)	smaller surface area (so less diffusion)	1	
	Total	**45**	