

**QUESTIONSHEET 1**

(a)	5 correct plots;;; (-1 mark each incorrect plot)	3
(b)	1600/4; = 400 kJ; (i mark for correct working if answer incorrect)	2
(c)	the more vigorous the activity the more energy used;	1
(d) (i)	in the lungs/alveoli;	1
(d) (ii)	playing tennis;	1
<b>TOTAL</b>		<b>8</b>

**QUESTIONSHEET 2**

(a)	in body cells;	1
(b)	1 - glucose/oxygen; 2- oxygen/glucose; 3 - carbon dioxide/water; 4 - water/carbon dioxide;	4
(c)	breathed out by lungs;	1
(d)	to contract/cause movement;	1
<b>TOTAL</b>		<b>7</b>

**QUESTIONSHEET 3**

(a)	A - trachea/windpipe; B - rib; C - intercostal/rib muscles; D - lung; E - diaphragm;	5
(b) (i)	D;	1
(b) (ii)	A;	1
(b) (iii)	E;	1
(c)	heart;	1
(d) (i)	some oxygen used by body; for respiration/absorbed by blood;	2
(d) (ii)	carbon dioxide is produced in respiration; and exhaled by lungs;	2
<b>TOTAL</b>		<b>13</b>

**QUESTIONSHEET 4**

- (a) water is boiled to remove oxygen;  
water is cooled to prevent damage to yeast, 2
- (b) carbon dioxide; 1
- (c) milky/cloudy; 1
- (d) (i) 1 of:  
same concentration of sugar;  
same amount of yeast;  
same volume of limewater; 3
- (ii) 30°C; 1
- (iii) yeast respire more rapidly;  
and produces more carbon dioxide/produces carbon dioxide more quickly; 2
- TOTAL 10**

**QUESTIONSHEET 5**

- (a) (i) lungs; 1
- (ii) trachea/windpipe; 1
- (iii) bronchus; 1
- (iv) diaphragm; 1
- (b) volume inside bell jar increases;  
pressure inside bell jar falls;  
air is drawn into glass tube A causing balloons to inflate; 3
- TOTAL 7**

**QUESTIONSHEET 6**

- (a) (i) 140; 1
- (ii) It decreases to 100; 1
- (b) It decreases to 44; 1
- (c) 10 years; 1
- (d) Death rate drops very quickly;  
provided they don't start again they have a much better chance of living; 2
- TOTAL 6**

## QUESTIONSHEET 7

1. Inhaled air contains approximately 20% oxygen.
2. When we breathe in the diaphragm relaxes.
3. When we breathe in the volume of the lungs increase.
4. Exhaled air contains approximately 5% oxygen.
5. The air we breathe out contains more carbon dioxide than the air we breathe in.
6. When we exercise vigorously, the volume of each breath increases.
7. The air we breathe out contains the same amount of nitrogen as the air we breathe in.
8. Exhaled air contains approximately 10% carbon dioxide.
9. Gases enter and leave the blood through the walls of the bronchioles.
10. When we breathe in the intercostal muscles relax.

TOTAL 5

## QUESTIONSHEET 8

- (a)  $\frac{21 + 19 + 20 + 19 + 21}{5}$ ; = 20 breaths per minute; 2
- (b) As speed of walking increases, rate of breathing increases; 1
- (c) From 2 km per hour to 4 km per hour; 1
- (d)  $\frac{5}{15} \times 100$ ;  
= 33%; 2

TOTAL 6

**QUESTIONSHEET 9**

- (a) E; 1
- (b) (i)  $14 + 15 + 12 + 14 + 16$ ; (correct graph readings)  
 $\frac{71}{5}$ ; = 14.2 breaths per minute; 3
- (ii)  $24 + 26 + 18 + 22 + 25$ ; (correct graph readings)  
 $115$ ; = 23 breaths per minute; 3
- (c)  $\frac{6}{12} \times 100$ ;  
= 50%; 2
- (d) Lowest resting breathing rate;  
smallest increase during exercise; 2
- (e) Exercise requires more energy;  
more oxygen needed to release energy;  
increased breathing rate supplies more oxygen;  
increased carbon dioxide production stimulates breathing; 4
- TOTAL 15**

**QUESTIONSHEET 10**

- (a) Suitable scales;  
axes labelled; ( $\text{CO}_2$  concentration must be on y axis)  
correct plots;  
join points with straight line; 4
- (b) increases;  
by 4 breaths per minute; 2
- (c)  $1.1 \times 18$ ;  
=  $19.8 \text{ dm}^3$  per minute; 2
- TOTAL 8**

**QUESTIONSHEET 11**

(a)	Breathing rate increases with exercise;	1
(b)	(i) $18 \times 0.5$ ; $= 9 \text{ dm}^3$ ;	2
	(ii) $28 \times 2$ ; $= 56 \text{ dm}^3$ ;	2
(c)	$22 \times 1.4 = 30.8 \text{ dm}^3$ ;  $\frac{30.8 \times 20}{100}$ ; $= 6.16 \text{ dm}^3$ ;	3
		<b>TOTAL 8</b>

**QUESTIONSHEET 12**

(a)	$500 \text{ cm}^3$ ;	1
(b)	$1100 \text{ cm}^3$ ;	1
(c)	Volume of each breath increases as carbon dioxide concentration increases;	1
(d)	Increase/get faster/more breaths per minute;	1
		<b>TOTAL 5</b>

**QUESTIONSHEET 13**

- (a) X - bronchi;  
Y - bronchiole; 2
- (b) alveoli; 1
- (c) 3 of:  
large surface area;  
moist surfaces (for gas exchange);  
well supplied with blood vessels;  
thin-walled air sacs/alveoli; 3
- (d) intercostal muscles contract;  
moving ribs up and outwards;  
diaphragm contracts and moves downwards;  
volume of thorax is increased;  
pressure in thorax is reduced;  
air is drawn in to equalise pressure; 6
- TOTAL 12**

**QUESTIONSHEET 14**

- (a) 22 mg/100 cm<sup>3</sup> of blood; 1
- (b) 68 mg; 1
- (c) 45 minutes; 1
- (d) anaerobic respiration; 1
- (e) extra oxygen is needed;  
to remove the lactic acid from the blood; 2
- TOTAL 6**

**QUESTIONSHEET 15**

(a)	(i)	0.5 dm <sup>3</sup> per minute;	1
	(ii)	3.9 dm <sup>3</sup> per minute;	1
(b)	(i)	increases;	1
	(ii)	more energy used when walking faster; more oxygen needed to enable faster respiration;	2
(c)		Each minute, 3 litres of oxygen are required The body uses 20% of the oxygen taken in, So oxygen taken in = 5 × amount used = 15 litres a minute	2
		As air is 20% oxygen, volume of air taken in = 5 × oxygen taken in = 75 litres a minute	2
		Each breath is 3 litres. So number of breaths = 75 ÷ 3 = 25	1
			<b>TOTAL 10</b>

**QUESTIONSHEET 16**

(a)	(i)	towards test tube;	1
	(ii)	snails take in oxygen from air in tube; volume of air in tube decreases; air is drawn towards tube; pulling oil drop towards tube;	4
(b)		water (vapour);	1
(c)		snails respire more rapidly; use up more oxygen; oxygen removed from tube more rapidly;	3
			<b>TOTAL 9</b>

**QUESTIONSHEET 17**

(a)	(i)	80 beats per minute;	1
	(ii)	14 beats per minute;	1
(b)		115 beats per minute;	1
(c)		19 breaths per minute;	1
(d)	(i)	$\frac{60}{80}$ ; = 0.75 seconds;	2
	(ii)	$\frac{60}{135}$ ; = 0.44 seconds;	2
(e)		4 minutes	1
			<b>TOTAL 9</b>

**QUESTIONSHEET 18**

(a)	(i)	both use sugar; both produce energy;	2
	(ii)	in man lactic acid produced/in yeast alcohol produced; in yeast carbon dioxide produced;	2
(b)	(i)	release of energy; without oxygen;	2
	(ii)	during vigorous exercise;	1
(c)	(i)	35°C;	1
	(ii)	optimum temperature for yeast enzymes; therefore respiration most rapid at this temperature;	2
(d)		enzymes in yeast denatured/destroyed at this temperature;	1
			<b>TOTAL 11</b>



**QUESTIONSHEET 19**

(a)	(i)	36.3;	1
	(ii)	41.6;	1
(b)		54.4;	1
(c)		Decreased; from 48.2 to 39.3;	2
(d)		Female non-smokers;	1
(e)		Decreased between 1978 and 1988 by 2.7%; Increased between 1988 and 1998 By 8.0%;	2
(f)		Most women now work to earn money and so can afford cigarettes/ peer pressure in young women/increased stress of modern life/any other valid reason;	1
			<b>TOTAL 9</b>

**QUESTIONSHEET 20**

(a)		A - red blood cell; B - white blood cell; C - alveolus; D - film of moisture;	4
(b)		capillary;	
(c)	(i)	carbon dioxide;	1
	(ii)	oxygen;	1
(d)		diffusion;	1
(e)		movement of air into and out of alveolus;	1
(f)		combines with haemoglobin/forms oxyhaemoglobin; in red blood cells;	2
(g)		epithelial cells lining trachea have layer of mucus; which traps dust particles and bacteria; cilia move mucus with trapped particles and bacteria to back of throat/out of lungs;	3

TOTAL 14