01. 0610_s20_MS_41 Q: 1

(a) *one mark for each column:* — **4**

	diaphragm	intercostal muscles		pressure change in the thorax
		internal	external	
breathing in	contract	relax	contract	decreases (**A** increases)
breathing out	relax	contract / relax	relax	increases (**A** decreases)

;;;;

(b) *any two from:* — **2**
thin / short distance (for diffusion) ;
well supplied by blood / surrounded by capillaries / AW ;
good ventilation with air ;

(c)(i) — **2**
a group of cells with similar structures ;
working together to perform a shared function ;

(c)(ii) *any two from:* — **2**
forms incomplete rings around, trachea / bronchi ;
keeps (named) airways open ;
reduces resistance to movement of air ;
protects (named) airways ;
sound production in larynx ;

---

02. 0610_s17_MS_42 Q: 3

	Answer	Mark	Partial Marks
(a)	(motor / effector) neuron(e) / nerve (cell) ;	1	**R** relay / sensory / SAN / pacemaker
(b)(i)	see table below	3	one mark per row
(b)(ii)	to prevent backflow / AW ; ensures one-way flow of blood (through the heart) ;	1	**I** pressure changes
(c)(i)	43 ;; OR 48 ;;	2	one mark for correct working if value incorrect
(c)(ii)	**1** increased electrical activity during exercise ; **ora** **2** comparative data before ; **3** no / small, difference in, height of peak / amplitude ; **4** waves closer together during exercise / S–T interval is shorter ;	3	
(c)(iii)	deeper (breaths) / increased volume (of lung) ; faster (rate) ; AVP ;	2	

(b)(i)

position on Fig. 3.1	result of electric activity	atrioventricular valves	semilunar valves
P	atria contract	open	closed ;
QRS	ventricles contract	closed	open ;
T	atria and ventricles relaxed	open	closed ;

---

03. 0610_w17_MS_41 Q: 2

	Answer	Mark	Partial Marks
(a)	watch chest / abdomen, rise and fall / use a spirometer ; ref. to time / in one minute ;	2	
(b)	exercise will increase breathing rate ; after exercise the breathing rate, will start decreasing / levels off ;	2	
(c)	*description* carbon dioxide constant / at 4.7% , before exercise ; carbon dioxide highest / higher, at 6.0% / (immediately) after exercise ; decreases; falls below resting level / AW ; comparative data quote ; *explanation* removal of excess carbon dioxide ; more energy used during exercise means higher rates of respiration ; aerobic respiration releases carbon dioxide ; oxygen not supplied fast enough (from lung / heart) / more oxygen required by muscles ; oxygen debt ; anaerobic respiration (in muscles) ; (produces) lactic acid / lactate; lactic acid is, broken down / respired / converted to glucose / converted to carbon dioxide ;	6	**A** 4.6%.
(d)(i)	safety risk (not to over exercise) ; CHD could change the expected result (for healthy people) ; she does not show (named) risk factor ;	1	**A** suitable suggestion related to CHD **I** 'danger' unqualified
(d)(ii)	prevents blocked arteries / prevents thrombus formation ; lowers blood pressure ; lowers cholesterol / lowers fats / reduces risk of atheroma ; weight loss / using fats / avoids obesity ; lowers stress ; (heart) muscle stronger / lower (resting) pulse ;	3	**A** increased stroke volume

---

04. 0610_w17_MS_43 Q: 1

	Answer	Mark	Partial Marks
(a)	carbon dioxide / CO_2 ; water (vapour) ;	1	
(b)	**1** **B** are cilia ; **2** **C** is mucus ; **3** **C / D**, are goblet cells ; **4** **E** is cartilage ; **5** **B** / cilia, waft / beat, mucus / **C** (up / out of, the airway) ; **6** **C / D** / goblet cells, secrete, mucus / **C** ; **7** **C** / mucus, traps, particles / pathogens ; **8** **B / C / D** / AW, prevent infections ; **9** **E** / cartilage, keeps the, airway / trachea, open ;	6	max 2 marks for labels **A** prevent collapse
(c)(i)	**U** **P ;** **T** **S** **Q** **R ;** **V**	2	
(c)(ii)	**1** for, gas exchange / diffusion / movement of CO_2 and O_2 ; **2** short distance (for diffusion / gas exchange) ; **3** fast (gas exchange / diffusion) ;	2	
(d)	**1** haemoglobin is, abnormal / rigid / AW ; **2** abnormal haemoglobin carries less oxygen (than normal haemoglobin) ; **ora** **3** red blood cells are, sickle shaped / AW ; **4** (sickle cells) stick together / clot (in blood vessels) ; **5** fewer red blood cells ;	3	**A** abnormal haemoglobin does not carry O_2 **A** not biconcave **A** blocked vessels / stuck / more red blood cells broken down

---

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)</td><td>
<table>
<tr><th>function</th><th>letter</th><th>name</th></tr>
<tr><td>structure that makes sounds</td><td>A</td><td>larynx</td></tr>
<tr><td>bone that provides protection for the lungs</td><td>E</td><td>rib;</td></tr>
<tr><td>airway that allows passage of air only into the right lung</td><td>J</td><td>bronchus ;</td></tr>
<tr><td>airway that allows passage of air into both lungs</td><td>B</td><td>trachea ;</td></tr>
<tr><td>contracts to increase the volume of the thorax</td><td>F/G</td><td>(F) diaphragm/ (G) external intercostal muscle ;</td></tr>
<tr><td>muscle that contracts to lower the ribcage</td><td>K</td><td>internal intercostal muscles ;</td></tr>
<tr><td>site of gas exchange</td><td>M</td><td>alveoli ;</td></tr>
</table>
</td><td>[6]</td><td></td></tr>
<tr><td>(b)</td><td>keeps, airways/trachea/bronchi, open;
allows (free flow of) air into (the lungs);
allows flexibility/can breathe even when, bent/swallowing/AW ;
AVP;</td><td>[max 2]</td><td>I protection</td></tr>
<tr><td>(c) (i)</td><td>(aerobic) respiration;</td><td>[1]</td><td>R anaerobic respiration</td></tr>
<tr><td>(ii)</td><td>rate (of breathing) increases;</td><td>[1]</td><td>R it increase
A it's faster / deeper</td></tr>
<tr><td>(iii)</td><td>stimulus (is CO_2); A acidic/pH, of blood decreases;
(CO_2 / pH) detected by the brain ;
by a receptor;
ref to (named) neurone in context ;
brain sends impulses to, (intercostal) muscles/diaphragm/effectors ;
(intercostal) muscles/diaphragm/effectors, contract more (frequently) ;
negative feedback/homeostasis;
reflex/automatic/involuntary;</td><td>[max 3]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 13]</td><td></td></tr>
</table>