

WJEC (Wales) Biology GCSE
Topic 1.2 Respiration and the
Respiratory System in
Humans
Questions by Topic - Mark
Scheme

1.	Question	Marking details	Marks Available
	(a)	45/ 46%;	1
	(b)	(i) 65.5/ 66 years;	1
		(ii) Lung cancer/ emphysema/ walls of alveoli rupture/ owtte/ correct ref to damage to cilia/ drying mucus; NOT reference to tar alone/ bronchitis;	1
	(c)	Live longer/ could expect to live to 85/ avoid earlier death; NOT less chance of dying; (Live longer) without a (smoking related) {disability/ cancer/ named damage};	2
		Question Total	[5]

2.

Marking details

Marks Available

Indicative content

Similarities: both break down glucose and release energy.

Differences: muscle cells produce lactic acid and no carbon dioxide during anaerobic respiration. Aerobic respiration produces water and carbon dioxide. Aerobic uses oxygen and anaerobic does not. Anaerobic creates oxygen debt, aerobic does not.

Aerobic is more efficient because it releases more energy per glucose molecule than anaerobic because it completely breaks down glucose.

5-6 marks

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3-4 marks

The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1-2 marks

The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit

Question '2' Total

[6]

3.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a) i	1	6;			
ii	1	Anaerobic;			
iii	2	At zero min/ between 0-2/ at beginning/ before exercise starts; most aerobic respiration is occurring; 2 nd mark linked to 1 st	Least/ lowest lactic acid produced	Oxygen debt	
(b)	1	Muscle;			
Total Mark	5				

4.	Question	Marking details	Marks Available
	(a)		
		(ii) Less lactic acid; Greater volume of {air/ gas} breathed in (and out); lactic acid level drops {faster/ sooner};	3
	(b)	glucose;	1
	(c)	{Increased/ more} (rate of) <u>aerobic</u> respiration/ more carbon dioxide produced by <u>aerobic</u> respiration;	1
	(d)	{More/ all} glucose completely broken down/ less anaerobic respiration (NOT no anaerobic respiration)/ more aerobic respiration/ no oxygen debt/ more oxygen available to repay oxygen debt/ extra oxygen breaks down lactic acid;	1

5.	Question	Marking details	Marks Available
	(a)	(iv) To show any gas (carbon dioxide) production was caused by yeast/ eliminate oxygen/ prevent aerobic respiration/ to be able to measure from {the same starting point/ zero}; NOT so no gas present	1
		(iv) To show any gas (carbon dioxide) production was caused by yeast/ eliminate oxygen/ prevent aerobic respiration/ to be able to measure from {the same starting point/ zero}; NOT so no gas present	1
	(b)	(i) Oxygen debt;	1
		(ii) Lactic acid;	1
		(iii) Would be reduced;	1
		(iv) Aerobic;	1

6.	Question	Marking details	Marks Available
	(a)	Oxygen <u>and</u> carbon dioxide;	1
	(b)	(i) I scale;	1
		II correct plots;	2 (-1 error)
		III line quality;	1
	(ii)	I increase then plateau;	1
		II 4 – 6 days;	1
	(c)	No <u>respiration</u> (in dead peas);	1

7.	Question		Marking details	Marks Available
	7	(a)	There is less lactic acid (in blood) (than A); There is a faster {removal/ break down} of {lactic acid/payback of oxygen debt}; NOT faster return to normal	2
		(b)	(i) 3:1;	1
		(c)	Glucose is completely broken down; Releases more energy/produces more ATP; NOT produces more energy	2

8.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)			2	Anjum produces less lactic acid/ concentration of lactic acid is lower; It is broken down quicker / removed quicker / repays oxygen debt quicker/ needs a shorter time to recover;			
(b)			1	The marathon runner does not need to release energy {quickly / in a short time} (like a sprinter);			
Total Mark			3				

9.	Marking details	Marks available					
		AO1	AO2	AO3	Total	Maths	Prac
	<p>Indicative content:</p> <ul style="list-style-type: none"> Equation 1 shows aerobic respiration. Equation 2 shows anaerobic respiration. <p>Aerobic respiration</p> <ul style="list-style-type: none"> occurs all the time / when oxygen is available releasing most energy from glucose molecules/ producing <u>more</u> molecules of ATP glucose completely broken down This is an advantage of aerobic respiration . <p>Anaerobic respiration</p> <ul style="list-style-type: none"> occurs when blood/body cannot supply sufficient oxygen (to muscles)/ does not require oxygen releasing less energy / <u>fewer</u> molecules of ATP are produced glucose molecules incompletely broken down This is a disadvantage of anaerobic respiration (Another disadvantage is it also) produces lactic acid/ oxygen debt/ muscle fatigue . <p>5-6 marks Detailed description of the entire process <i>There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</i></p> <p>3-4 marks General outline of aerobic and anaerobic respiration <i>There is a line of reasoning, which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</i></p> <p>1-2 marks brief outline of aerobic and anaerobic respiration <i>There is a basic line of reasoning, which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</i></p> <p>0 marks: No attempt made or no response worthy of credit.</p>	6	0	0	6		
Question 9 total		6	0	0	6	0	0

10. Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
10	(a)	(i)	13.44/13.4/13 = 3 marks If incorrect award 1 mark for each of breathing rate = $5/25 \times 60 = 12$ (1) volume of CO ₂ = $5.6/5 = 1.12$ (1)		3		3	3	3
		(ii)	colour change is {subjective/qualitative}/ref. to difficulty of noting when colour has changed			1	1		1
	(b)	(i)	more {energy/ATP} is needed (for exercise) (1) from <u>aerobic</u> respiration (1)		2		2		
		(ii)	{more {energy/ATP} is now being released by} <u>anaerobic</u> respiration (1) Lactic acid production (causing cramp) (1)		2		2		
		(iii)	Individual 4 because they had <u>cramp</u> {at a lower intensity of exercise/ soonest}			1	1		
	(c)		more accurate measurement of aerobic respiration/ref. validity of conclusions/increased confidence			1	1		
			Question 10 total	0	7	3	10	3	4

11. Question			Marking details	Marks available																			
				AO1	AO2	AO3	Total	Maths	Prac														
11	(a)	(i)	4.9 = 1 mark 20.9-16.0 =		1		1	1															
		(ii)	{aerobic} respiration Reject anaerobic	1			1																
	(b)	(i)	arrow from alveolus through the lining	1			1																
		(ii)	reference to reduced <u>diffusion</u> (1) NOT stops diffusion any two from: {thick/ hard} lining to alveolus/ORa (1) wider gap between alveolus and capillary/ ORa (1) hardened lining to capillary/ORa (1) ignore thicker			3	3																
	(c)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">oxygen</td> <td style="width: 10%; text-align: center;">✓</td> <td style="width: 10%;">(1)</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>carbon dioxide</td> <td></td> <td></td> <td style="text-align: center;">✓(1)</td> <td></td> </tr> <tr> <td>water</td> <td></td> <td></td> <td></td> <td style="text-align: center;">✓ (1)</td> </tr> </table>	oxygen	✓	(1)			carbon dioxide			✓(1)		water				✓ (1)	3			3	
oxygen	✓	(1)																					
carbon dioxide			✓(1)																				
water				✓ (1)																			
			Question 11 total	5	1	3	9	1	0														

12. Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
12	(a)		Glucose \longrightarrow Lactic Acid + ATP	1			1		
	(b)		Not all the glucose is broken down/not completely broken down (1) Less ATP is produced (1) ORA for aerobic respiration	2			2		
	(c)	(i)	Correct reference to oxygen debt (1) Oxygen required to {break down/ remove} lactic acid (1)		2		2		
		(ii)	<u>More</u> oxygen can get to {cells/ tissues/ muscles/ body/ organs}/ oxygen can get to {cells/ tissues/ muscles/ body/ organs} <u>quicker</u>		1		1		
	(d)		more haemoglobin (1) (So) more oxygen can be carried (by the blood)/ more oxygenated blood / {more/ longer} <u>aerobic</u> respiration (1)		2		2		
			Question 12 total	3	5	0	8	0	0

13.

Question	HIGHER TIER	Marks
(a)	<p>Working down, the order is:</p> <ul style="list-style-type: none"> • trachea • bronchiole • bronchus • alveoli <p>1 each correct to maximum of 3</p>	3
(b)	<p>Indicative content</p> <p>When you inhale:</p> <ul style="list-style-type: none"> • Intercostal muscles contract, expanding the ribcage • The diaphragm contracts, pulling downwards to increase the volume of the chest. • Pressure inside the chest is lowered and air is sucked into the lungs. <p>When you exhale:</p> <ul style="list-style-type: none"> • The intercostal muscles relax, the ribcage drops inwards and downwards. • The diaphragm relaxes, moving back upwards, decreasing the volume of the chest. • Pressure inside the chest increases and air is forced out. <p>Marking bands</p> <p>5-6 marks. The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>	6 QWC
(d)	<p>Body</p> <p>so rate of oxygen supply needs to increase [1]</p> <p>The points must be correctly and coherently connected for 2 marks.</p>	2

14. Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)	Both for 1 mark Tomos 9.5 dm ³ and Jeremy 16 dm ³	1			1	1	
	(ii)	To obtain more oxygen into the {bloodstream/ muscles} / get rid of lactic acid/ repay oxygen debt		1		1		
(b)	(i)	{Almost all/ Most} energy released comes from anaerobic respiration			1	1		
	(ii)	Anaerobic bar smaller than that for 1500m but bigger than that for marathon (1) Aerobic bar bigger than that for 1500m but smaller than that for marathon (1)		2		2	2	
(c)	(i)	Glucose + oxygen → carbon dioxide + water + {energy/ATP} Accept correct formulae	1					
	(ii)	Glucose → lactic acid + {energy/ ATP} Accept correct formulae	1					
(d)		Releases more {energy/ ATP} per glucose molecule than anaerobic/ completely breaks down glucose/ all the glucose is broken down	1			1		
		Question total	4	3	1	8	3	0

15. Question		Marking Point	Mark
(a)		Nasal cavity Trachea Bronchus alveoli	4
(b)		Less oxygen in air breathed out (1) more carbon dioxide in air breathed out (1)	2
(c)	(i)	Carbon dioxide (1) Water (1)	2
	(ii)	Respiration	1

16. Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		1	Bronchiole;	bronchioles		

17.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		2	A Trachea; B Bronchus;	windpipe Bronchi		
(b)	(i)	1	15, 13;			
	(ii)	2	14.3;; Correct answer – 2 marks, 43/3 – 1 mark incorrect answer but correct method – 1 mark 14.33 – 1 mark	ecf		
	(iii)	3	Ribs – down and in; Volume – decreased; Pressure – Increased;			
Total Mark		8				

18.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
18	(a)	(i)	Both for 1 mark Trachea + Bronchus NOT bronchiole	1			1		
		(ii)	Diaphragm {raised/ moves up/ becomes domed} (1) Volume decrease (1) Pressure increase (1)	3			3		
	(b)	(i)	exercise causes the breathing rate to increase = 1 mark more intense exercise, the <u>greater</u> {the increase/ the breathing rate} = 2 marks			2	2		
		(ii)	{More participants/increase sample size}/repeat the investigation			1	1		1
	(c)		<u>More</u> oxygen needed(1) For respiration (1)	2			2		
			Question 18 total	6	0	3	9	0	1

19.		Question	Marking details	Marks Available								
	(a)		large surface area; thin walls; NOT cell wall {extensive/large} capillary network; (NOT good blood supply)	3								
	(b)		Any one from <table border="1"> <thead> <tr> <th>Adaptation</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>large surface area</td> <td>increases area over which <u>diffusion</u> can occur;</td> </tr> <tr> <td>thin walls</td> <td>reduces <u>diffusion</u> distance/ short diffusion paths; Not diffusion occurs faster</td> </tr> <tr> <td>extensive capillary network</td> <td>maintains <u>diffusion</u> gradient;</td> </tr> </tbody> </table>	Adaptation	Explanation	large surface area	increases area over which <u>diffusion</u> can occur;	thin walls	reduces <u>diffusion</u> distance/ short diffusion paths; Not diffusion occurs faster	extensive capillary network	maintains <u>diffusion</u> gradient;	1 max
Adaptation	Explanation											
large surface area	increases area over which <u>diffusion</u> can occur;											
thin walls	reduces <u>diffusion</u> distance/ short diffusion paths; Not diffusion occurs faster											
extensive capillary network	maintains <u>diffusion</u> gradient;											

20.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)			1	Diaphragm			
(b)			3	the volume decreases; the pressure increases; air is {forced /pushed out}; 3 rd mark linked to 2nd		Reference to thorax	Answers referring to volume in balloon Move out
Total Mark			4				

21.

Marking details

Marks
Available

Indicative content

6

The balloons represent lungs.
The rubber sheet represents diaphragm.
When rubber sheet is pulled down,
the volume of air-tight space around balloons increases
and pressure decreases/ drops/ goes down.
The balloons inflate/ expand/ blow up as
air is drawn in.

5-6 marks

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3-4 marks

The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1-2 marks

The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit

22.

Question	Marking details	Marks Available
(a)	(i) Greater;	1
	(ii) Less;	1
	(iii) Greater;	1
	(iv) Less;	1
(b)	<p>Any two from</p> <p>Answers must compare bell jar and human</p> <p>The {diaphragm/rubber sheet} in bell jar model is pulled down during inspiration, whereas in the thorax the diaphragm is flattened. (OWTTE);</p> <p>The (wall of the) bell jar is {rigid/does not move}, whereas (the wall of the) {thorax/chest/ribs/ribcage} is {flexible/moves} (and moves during breathing). (OWTTE);</p> <p>Accept {thorax/ ribcage} expands <i>NOT ribs expand</i></p> <p>The bell jar cavity is filled with air, whereas the thoracic wall is filled with body fluid. (OWTTE);</p> <p>In the bell jar there's a large space around the 'lungs'/balloons in the thorax the space is very small. (OWTTE);</p>	2

Question 22 total

[6]

23.

Question	Marking details	Marks Available
(a)	<p>Any 4</p> <p>Intercostal muscles <u>contract and</u> ribs move <u>up and out</u>;</p> <p>Diaphragm (muscles) <u>contract and</u> diaphragm <u>flattens</u>;</p> <p>(Internal) volume of <u>thorax</u> increases; accept chest reject lungs</p> <p>Pressure in lungs/ thorax decreases;</p> <p>{Higher/ <u>difference in</u>} air <u>pressure</u> outside {forces/ pushes/ moves/ drawn} air into lungs;</p>	4

24.

Question		Marking details	Marks Available
	(b)	<p>Any four from:</p> <ul style="list-style-type: none"> • Intercostal muscles contract (and expand the ribcage); • (outer) pleural membranes pulled out (by expanding ribcage); • pleural pressure reduced; • (inner) pleural membrane pulls on lungs and expand alveoli; • alveolar pressure lowers; • air moves in {when alveolar pressure is lower than atmospheric pressure / and increases alveolar pressure}; • reference to data from graph; 	4

25.

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)	Diaphragm shown as flattened , below original on diagram		1		1		
(b)	(i)	Diffusion (in correct context) (1)	1			3		
	(ii)	<p>Any two (x1) from: large surface area (1) Thin wall / wall is one cell thick (1) NOT thin cell wall Close to {blood vessel/ blood supply/ capillary}/ {rich/ good} blood supply / surrounded by capillary(1) Layer of {moisture/ water} (1)</p>	2					
(c)	(i)	Increase in {cases/ cancer} with increase in age.			1	1		
	(ii)	{Highest proportion of / highest number of / most} smokers are the 20 – 29 year olds but {the highest incidence of/ most} cancer is in {older people/ 80 year olds} (1)			1	1		
	(iii)	Extend investigation to other {cities/ towns/ areas} (1) Include women in the investigation (1)			2	2		2
Question total			4	1	4	9	0	2

26.

Question		Marking details	Marks Available
26	(a)	A trachea/cartilage ring; NOT windpipe B alveoli/ alveolus; Accept air sac	2
	(b)	(i) (Diaphragm) down/flattens; NOT contract (can be neutral) (Ribs) up and out/ribcage expands;	2
		(ii) Decreases	1
Question 26 Total			[5]

27.

Marking details

Marks Available

Indicative content

Diaphragm contracts
 Diaphragm flattens/moves down
 Intercostals muscles contract
 Rib cages moves up and out/raised
 Thoracic volume/accept chest volume/accept space around the lungs increases
 Pressure decreases
 Lungs inflate
 Air drawn into lungs through nose/nasal passages/trachea/windpipe

5-6 marks

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3-4 marks

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1-2 marks

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0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit

Question Total

[6]

28.

(a) Beat;

Move mucus + bacteria upwards.

[2]

29.

Mark	Answer	Accept	Neutral answer	Do not accept
6 QWC	<p>Indicative content:</p> <p><i>diaphragm</i></p> <ul style="list-style-type: none">• contracts• flattens/ moves down <p><i>ribcage</i></p> <ul style="list-style-type: none">• moves up and out• volume of chest/ thorax increases• air pressure in chest/ thorax falls• lung volume increases/ lungs inflate• external air pressure is now higher• so air rushes/is pushed in <p>5-6 marks</p> <p>The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks</p> <p>The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks</p> <p>The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks</p>			

30.			Question	Marking details	Marks Available
30	(a)	(i)			
		(iii)		Sodium hydroxide/potassium hydroxide/soda lime; Accept Sofnolime (trade name in diving community)	1
		(b)	(i)	(The lime water in test tube A {remains/is}) {clear/colourless}; NOT no change/does not go cloudy/stays the same (The lime water in test tube B would turn) milky/cloudy;	2

31.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)				4	Cells; Oxygen; Water; Enzymes;			
(b)				2	carbon dioxide; (Lime water)turns {cloudy/ milky/ white};	CO ₂ cream		CO ²
Total Mark				6				

32.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a) i	2	paralyse cilia/ cilia unable move; mucus becomes {clogged/ dried}/ mucus builds up/ mucus thicker;	Mucus production increases	cilia {harmed/ don't work}/ mucus increases	cilia killed
ii	1	tar;			
(b) i	1 2 1	suitable scale, correctly labelled; plotting must start at y axis all plots correct ($\frac{1}{2}$ small square tolerance); not extrapolated (all correct = 2 marks, 1 error = 1 mark, >1 error = 0 marks) line quality; drawn with ruler			
ii	2	Increase in number of cigarettes smoked increases <u>number of deaths</u> (from lung cancer); Small increase to <u>20</u> then a sharp increase;			
iii	1	60;	Ecf from graph		
iv	1	Some lung cancer deaths for 0 cigarettes/ some people who do not smoke die from lung cancer;			
(c)	1	<u>Reference to {dangers/ harm}</u> of {passive smoking/ second hand smoke /secondary smoking};	Passive smoking makes people ill		second hand smoke affects people
Total Mark	12				

33.

Mark	Answer
6 QWC	<p>Indicative content</p> <ul style="list-style-type: none"> • Harmful effects on cilia and mucus • Tar/ carcinogens and lung cancer • Smoke inhalation causes coughing • Which can result in emphysema leading to shortness of breath due to alveoli damage • Smoking is less/ not socially acceptable now because of proof of harmful effects • Passive smoking • Attempts at reduction include <ul style="list-style-type: none"> ▪ stopping adverts, ▪ banning smoking in public places, ▪ warnings on packets and increase in cost ▪ stopping the display of cigarettes in shops <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(b)	(i)		X – cilia (1) Y – mitochondria/ mitochondrion (1)	2			2		
	(ii)		{Provides/ releases} {energy/ATP} (1) for movement of {cilia/ part X}/ cilia {sweeping/carrying} (1) mucus away (1)		3		3		
(c)			Dust/ tar/ bacteria/ microbes/ viruses	1			1		
	(ii)		Chewing gum (1) Largest sample/ greatest number of people in sample (1) 2 nd mark linked to 1 st			2	2		2
	(iii)		Nasal spray (1) Largest percentage gave up/ biggest difference between test and placebo (1) 2 nd mark linked to 1 st			2	2		2
Question total				3	4	5	12	1	6

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
35	(a)		<ul style="list-style-type: none"> Increase in number of cigarettes smoked related to increased deaths (per year from lung cancer) (1) Decrease linked to fall in death rate (1) Time lag between reduction in smoking and reduction in death rate. $\frac{1951 - 71}{OWTTE}$ (1) 			3	3		
	(b)	(i)	B		1		1		
		(ii)	C		1		1		
	(c)		Nicotine (1) is addictive (1)	2			2		
Question 35 Total				2	2	3	7	0	0

Question			Marking details	Marks Available
	(a)		The more cigarettes smoked the higher deaths. The more cigarettes smoked higher {incidence/ chances} of lung cancer (OWTTE); {lag/delay/gap} {between commencement of/ time that they smoke/ smoking/ cigarette consumption} and possibility of (death from) lung cancer (OWTTE); Accept the more cigarettes smoked, the higher the deaths from lung cancer and these are roughly 20 years apart = 2 marks	2
	(b)		Accept any year between 1943 & 1947;	1
Question 36 Total				[3]

37.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)		1	The <u>increased number of cigarettes</u> smoked the <u>more deaths from lung cancer</u> / the more you smoke the more chance you have of <u>dying from lung cancer</u> (OWTTE);			Higher risk of dying/ cigarette smoking increases deaths from lung cancer
	(ii)	I	1	$(350 - 160 =)$ <u>190</u> ;			
		II	1	$(230 \times 30 = 230 \times 10 \times 3 =)$ <u>6900</u> ;			
	(iii)		1	People who don't smoke/smoke 0 cigarettes per day also die from lung cancer / can still get lung cancer;	{14/15/16} people die from lung cancer who do not smoke/ {420/450/480} people die from lung cancer in Wales who do not smoke		
(b)			1	Tar;		carcinogen	

38.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)			1	{Warnings/ notice/ information/ pictures} <u>on packets/ on the back</u> ;	'Smoking kills' on the packet		
(b)	(i)		2	Tar content increases (rates of lung cancer increases; Large increase at 11(mg) tar;	ORA		
	(ii)		1	Increases (rate of lung cancer);			

39.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)			Cancer	1			1		
(b)	(i)	I	all 5 points correct = 2 marks 4 points correct = 1 mark 0/1/2/3 points correct = 0 marks Tolerance +/- ½ small square		2		2	2	
		II	straight line connecting each point <u>including 2009</u>		1		1	1	
	(ii)		Any one from <ul style="list-style-type: none"> {line/%it/ results} did not fall {until after 2008/ until 2009} {line/%it/ results} stayed the same in 2008 values in (2007 and) 2008 {were the same/ did not change} {line/%it/ results} stayed the same for a year 			1	1		
	(iii)	I	Continuing trend from plotted points with straight line using a ruler from 2014 – 2020 + correct answer 13/ from candidates graph		1		1	1	
	(iv)		One (x1) from: raise price/excise duty/tax (1) education on dangers(1) encourage use of alternatives (1) raise age for buying cigarettes (1) plain packaging (1) Remove from display (1) NOT ban smoking		1		1		

40. Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)	(ii)	cancer/emphysema/ heart disease/ Cardio vascular disease/ CVD/ Coronary Heart Disease/ CHD/ stroke/ COPD/ damages cilia	1			1		
(b)	(i)	1. idea of {quite/ partly/ fairly/ mostly} {successful/ effective}OWTTE (1) because: 2. 25% smoked fewer(1) 3. 34% stopped smoking (1) } 59% cut down or stopped = 2 marks MP 2 and 3 can be only both be awarded if 'linked' (stated consecutively) 4. However 36% smoked the same and 5% smoked more/ 41% smoked the same or more (1) (stated consecutively)			4	4		
	(ii)	any two (x1) from: different areas/ all parts of Wales different ages male and female different ethnicities			2	2		2
Question 40 Total			2	0	6	8	0	2

41. Question	Marking details	Marks Available
41 (a)	Bronchiole	1