GCSE MARKING SCHEME

SCIENCE - BIOLOGY

SUMMER 2015

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2015 examination in GCSE SCIENCE - BIOLOGY. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

Biology 1

<table>
<tr><td colspan="2">Question Number</td><td colspan="3"></td><td></td><td></td><td></td><td></td></tr>
<tr><td>FT</td><td>HT</td><td colspan="3">Sub-section</td><td>Mark</td><td>Answer</td><td>Accept</td><td>Neutral answer</td><td>Do not accept</td></tr>
<tr><td>1</td><td></td><td>(a)</td><td></td><td></td><td>1</td><td>Eats meat/ other animals;</td><td></td><td>insects</td><td></td></tr>
<tr><td></td><td></td><td>(b)</td><td></td><td></td><td>3</td><td><table><tr><th>factor</th><th>Tick (✓) the three correct boxes</th></tr><tr><td>A disease harming the badgers</td><td></td></tr><tr><td>An increase in the number of foxes</td><td>✓;</td></tr><tr><td>The arrival of a new second stage consumer species</td><td>✓;</td></tr><tr><td>An increase in the number of beetles</td><td></td></tr><tr><td>A decrease in the area of woodland</td><td>✓;</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">Total Mark</td><td>4</td><td></td><td></td><td></td><td></td></tr>
</table>

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
2		*(a)*	i		1	0.5;	0.55		
			ii		2	larger; more slits/number slits from 3 to 5;			
			iii		1	dies out/ *idea of* gone for ever/ no longer exists/ wiped out;	None left		disappeared
			iv		1	no {shells/fossils} {in top layer/ in layer A/ in that layer}/ no shells after {5 million years/ 2 million years}/ last found in layer B;			
		(b)			1	(Charles) Darwin;	(Alfred) Wallace		
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)	i		1	2;			
			ii		1	pH <u>falls</u>/ water <u>becomes</u> {acidic/pH5};			PH/ Ph/ pH is acidic
		(b)	i		1	mayfly (nymph);			
			ii		2	• (mayfly nymph) is not found in acid water/ <u>only</u> found in {neutral <u>and</u> alkaline water/ water at pH 7 and above}; • {bloodworms/rat tailed maggots/ the others} are found in acidic (water); The only <u>one</u> that is found in <u>only</u> neutral <u>and</u> alkaline water/ only <u>one</u> not found in acidic water = 2 marks			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
4		(a)	i		4	I accurate plotting;; all correct = 2 marks one error = 1 mark more than one error = 0 marks II one accurate line through centre of plots; III lines labelled – 1.0 mm **and** 0.1mm;			
			ii		1	{1 mm/large/larger/ higher} mesh size has {higher/ more} (%) decay/ ORA;			Not quicker decay
			iii		2	any **two** from: mass; (leaf) area; {species/tree}; age; moisture content;	weight		type of leaf/ type of tree/ size of leaf/ amount of leaf/ same shape leaf
			iv		1	bacteria/fungi/mould;			
			v		1	too {cold/hot/dry/wet}/ hotter/ colder/ drier/ wetter;	pH too {high/ low}		Climate/ weather
		(b)			1	{Releases/ puts back/ restores/ gives/ recycles} {nutrients/ minerals/ ions/ named nutrient};			
		Total Mark			10				

Question Number					Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	Sub-section							
5		(a)			3	3 → 2 → 5 → 1 → 4 Correct placement All 5 correct;;; 3 marks 4/3 correct;; 2 marks 2 correct; 1 mark 0/1 0 marks			
		(b)			2	one mark for a named sense organ and the second mark for the <u>correct</u> stimulus;; one correct pair from: ear; sound/vibrations; or tongue/nose; chemical; or skin; touch/pain/temperature/pressure;			Noise Taste Heat
		Total Mark			5				

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
6		(a)			1	<u>hormone</u>;			
		(b)			3	pancreas; (phonetic spelling) glucose; (correct spelling) glycogen; (correct spelling)			pancrease
		(c)			2	(type 1 or type 2) diabetes; **one** from: <u>low</u> {sugar/ carbohydrate} {diet/foods}/ {injections/shots} of insulin/ insulin pen/ insulin pump/ pancreas transplant/ <u>named</u> tablets (e.g. novonorm/metformin);			Take insulin/ take tablets
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
7	**1**	(a)	i		1	Nn;	heterozygous		
			ii		2	He does not have cystic fibrosis therefore must have a {**N/dominant allele**} / He has to have a {**N /dominant allele**} to give to {the child without cystic fibrosis/ child **3**}; Has to have a {**n/recessive allele/ allele for cystic fibrosis** } to give to {child with cystic fibrosis/ child **4**} {child **4**/ child with cystic fibrosis} has to have a {**n/recessive allele**} from him**;**			
		(b)	i		1	Nn;	heterozygous		
			ii		2	She does not have cystic fibrosis and therefore must have a{ **N** allele/dominant allele}/ person **3** gets { **N** allele/dominant allele} from person **2**; Her mother has {cystic fibrosis/ **nn**} and therefore must give one {**n** allele/recessive allele}/ person **3** gets {**n** allele/recessive allele} from person **1**;			
		(c)			1	25%;			
		Total Mark			7				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
8	**2**	(a)			2	A hair B sweat gland			Hair follicle Sweat duct
		(b)	i		2	any **two** from • sweating/ produces sweat; • vasodilation/ blood vessels widen; • hairs lying flat/ hairs lie {flat/down}/ hairs lowered;		Erector muscle relaxes	sweat Blood vessels {open/ get bigger/ larger/thicken/ enlarge}/ expand. hairs are flat
			ii		2	<u>Less/not as much</u> blood flowing (through the blood vessels); therefore <u>less/not as much</u> heat is {lost/ radiated} 2nd mark linked to 1st mark			Any reference to blood vessels moving {up to/ down from} skin surface. No heat is lost
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
9	**3**	(a)			2	any **two** from: • liver {damage/ failure/disease}/ cirrhosis of the liver; • circulatory disease; • heart {damage/failure/disease}; • brain damage; • {throat/tongue/oesophagus/liver/breast/bowel} cancer; • kidney {disease/damage/failure};	kills brain cells		Liver problems Heart attack
		(b)	i		1	alcohol consumption {increases/slows} reaction time/ alcohol consumption slows {reactions/ reaction speed};			Less reaction time/ reaction time decreases
			ii		1	person 2;			
			iii		1	take longer to {react/brake/swerve} to avoid an accident/ longer to react to {danger/changes in road};		take longer to stop (needs to be qualified)	
		Total Mark			5				

Question Number			
FT	HT	Mark	Answer
10	**4**	6 QWC	*Indicative content:* *Credit should only be given where health issue is linked to the excess in the diet* • **ENERGY**: too much energy (taken in at lunch – excess energy stored as fat) leading to obesity • **SUGAR:** too much sugar (taken in at lunch) - this could possibly lead to diabetes (type 2)/ obesity/tooth decay • **FAT:** too much fat (taken in at lunch) - (possibly) leading to obesity/ heart disease/circulatory disease • **SODIUM:** too much salt (taken in at lunch) - could lead to high blood pressure • **EXERCISE**: ref to lack of exercise affecting circulation/heart For marks in 5-6 range: Account needs to recognise, at least once **EITHER** that the GDA is being exceeded **OR** that only one meal is being looked at and therefore when all the daily meals are considered then the overshoot of the GDAs are very great indeed. **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.
Total Mark		6	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	5	(a)	i		2	<u>different</u> {size/ length/ depth/ width}; <u>different</u> shape;			They are all pointed
			ii		1	They can eat <u>different</u> types of food/prey;		More food	
		(b)			3	any **three** from: • restriction on {number of tourists/ months allowed to land/ time allowed on island}; • restrict access to wildlife sites; • restrict building houses/ restrict building {hotels/ accommodation for tourists}; • educate tourists about endangered species; • {development/ road building} is carried out which causes minimal harm to wildlife/limit number of vehicles; • reduction of {litter/ pollution} from increased number of visitors and residents;			Stop tourism
		Total Mark			6				

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
	6	(a)			1	1985-1986;			
		(b)	I& II		1	1980 **and** 1990;			
		(c)			3	Line begins at 1980 above 0 and rises; peaks between1985-7; Then drops but not to 0;			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	7	(a)			1	*Muddy sand;*			
		(b)			1	birds*;*			
		(c)	i		1	(The level/concentration of lead) decreases/ becomes less;			
			ii		2	(18/20) x 100; 90; Correct answer = 2 marks			
			iii		2	Measure the {concentration/mass} of lead; In each (growth) ring/ in every fifth growth ring;	Measure how much lead		amount
		Total Mark			7				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	8	(a)			1	Less objection/ more agreement / more positive /more accepted /more popular;			Crop increased
		(b)			2	gene for herbicide resistance from {bacteria / plant / organism /species}; {Inserted into/ added into} {chromosome/ DNA} (of host plant / soya plant);	weed		
		(c)			3	Any **three** from • Crop yield increases with use of GM; • GM crop not 100% resistant; • GM plants not resistant to sap sucking insects/ sap sucking insects are not affected; • GM effective against leaf eating insects/ GM plants are resistant to leaf eating insects; • Less total insecticide used with GM crops/ less insecticide used to control leaf eating insects with GM crops; • A correct statement relating to data in table;			
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	9	(a)	i		1	Discontinuous;			
			ii		1	No black <u>allele</u> in white turkeys/ white allele is recessive/ white turkey is homozygous recessive;	Homozygous expressed as symbols		gene
		(b)	i		1	A **and** C;			
			ii		2	D **and** E; All (of the clones with the inherited disease) would <u>pass it on</u>;			
			iii		1	3;			
		Total Mark			6				

Question Number			
FT	HT	Mark	Answer
	10	6 QWC	Indicative content Bacteria and Fungi are decomposers Decomposers decay dead organisms/waste Conversion of protein to ammonia Conversion of urea to ammonia Ammonia converted to nitrate Nitrate taken up by plant (roots) Nitrate used to make protein Factors that affect the activity should include oxygen, temperature, pH and heavy metals (some factors must be present to access marks in the range 5-6) **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.
Total Mark		6	

Biology 2

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
1		(a)	i		2	A Cell wall B Chloroplast C Nucleus *3 correct = 2 marks* *2 correct = 1 mark* *0/1 correct = 0 marks*	A: cellulose wall		
			ii		2	1 yeast 2 alga 3 bacteria/ alga *3 correct = 2 marks* *2 correct = 1 mark* *0/1 correct = 0 marks*			Letters instead of names
		(b)	i		1	all organisms consist of one or more living cells;			
			ii		1	A virus is not a cell;	has genes and protein coat <u>only</u> / no cytoplasm/ no cell membrane/ <u>only reproduces</u> inside <u>cell</u>		No nucleus/ it requires a host
			iii		1	light microscopes **and** electron microscopes; (in order)	laser imaging as alternative for light microscope		
		Total Mark			7				

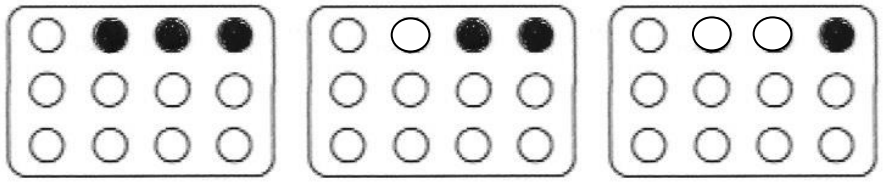
Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
2		*(a)*	i		1	Double helix;			
			ii		2	T,G,C *3 correct = 2 marks* *2 correct = 1 mark* *0/1 correct = 0 marks*			
		(b)			1	Proteins **and** amino acids;			
		Total Mark			4				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)			4	Cells; Oxygen; Water; Enzymes;			
		(b)			2	carbon dioxide; (Lime water)turns {cloudy/ milky/ white};	CO_2 cream		CO^2
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
4		(a)			1	Honey (bee) **and** bumble (bee);			
		(b)	i		1	{Loss of/less} nectar/ food (from wild flowers)/ {Loss of/less} nest sites/ {Loss of/less} habitat;			Fewer wild flowers/ wild flowers eaten by other animals Loss of space
			ii		2	480 000 **and** 180 000 OR 5 x 60 000; = 300 000; Correct answer = 2 marks			percentages
			iii		1	honey bee pollinates {food plants/ veg/ fruit}/ honey bee produces {food/ honey};			
		(c)			2	(loss of solitary bees) results in loss of {a number of/ <u>many/ 260</u>} species; (no pollination) – loss of species of wild flowers;			
		Total Mark			7				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
5		(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 (½ 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				

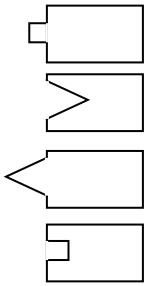
<table>
<tr><th colspan="2">Question Number</th><th colspan="3" rowspan="2">Sub-section</th><th rowspan="2">Mark</th><th rowspan="2">Answer</th><th rowspan="2">Accept</th><th rowspan="2">Neutral answer</th><th rowspan="2">Do not accept</th></tr>
<tr><th>FT</th><th>HT</th></tr>
<tr><td>6</td><td>1</td><td>(a)</td><td></td><td></td><td>2</td><td>Water;
Oxygen;</td><td>H_2O
O_2</td><td>Sunlight or Chlorophyll on arrow</td><td>H2O
O2</td></tr>
<tr><td></td><td></td><td>(b)</td><td>i</td><td></td><td>2</td><td>All correct = 2 marks
1 error = 1 mark
> 1 error = 0 marks
<table><tr><th>Apparatus</th><th>Presence or absence of starch
✓ or ×</th></tr><tr><td>A</td><td>×</td></tr><tr><td>B</td><td>✓</td></tr><tr><td>C</td><td>×</td></tr><tr><td>D</td><td>×</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>ii</td><td>I</td><td>1</td><td>B and C;</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>II</td><td>1</td><td>A and B;</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Total Mark</td><td>6</td><td></td><td></td><td></td></tr>
</table>

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
7	**2**	(a)	i		2	both substrate molecules having entered the enzyme; an attempt to make them connect;			
			ii		1	Lock and Key;		Enzyme substrate complex	
			iii		2	(Boiling) alters the shape of the {enzyme/active site}/ denatures enzyme; so the molecules do not fit into enzyme/ active site;			
		(b)			3	1 mark for each correct row;;;  **NB only allow marks if some cavities shaded**			
		Total Mark			8				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
8	**3**	(a)			1	Bronchiole;	bronchioles		
		(b)	i		1	15;			
			ii		2	3 – 0.6 = 2.4 litres/ l;; [NB unit required for 2 marks] Correct readings but incorrect answer = 1 mark 2.4 but no units = 1 mark No mark for correct unit only	L for litres		
		Total Mark			4				

Question Number			
FT	HT	Mark	Answer
9	**4**	6 QWC	*Indicative content:* ▪ use of disinfectant to wash both sets of peas ▪ (fill) a Thermos flask with these living peas ▪ ref to dead peas **acting as control** ▪ same {mass/ volume/ number} of peas should be used in both flasks ▪ place a thermometer into the peas ▪ place/ put cotton wool into the neck of the flask ▪ record temperature at {regular intervals/ every hour/ every day/ stated times} ▪ compare temperatures in both flasks **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.
Total Mark		6	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	5	(a)			1	Peristalsis;	phonetic spelling		
		(b)	i		2	(Mass of food remaining undigested) increases until pH5; {levels off/ plateaus} at pH5; It increases until pH 5 where it levels off (2 marks)			
			ii		1	3;			
			iii		2	Stomach; Protein;			
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	6	(a)	i		2	 Each shape needs an oblong + an indentation or a protrusion. *4 shapes correct = 2 marks* *3 shapes correct = 1 mark* *0/1/2 shapes correct = 0 marks*			
			ii		2	Cytosine Adenine Thymine Guanine **Spelling must be correct** *4 names correct = 2 marks* *3 names correct = 1 mark* *0/1/2 names correct = 0 marks*			
		(b)			2	Three bases form a <u>code</u>/ a triplet <u>code</u>; (Code) determines the {order/ sequence} of the amino acids;			
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	7	(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; 2nd mark linked to 1st	Least/ lowest lactic acid produced	Oxygen debt	
		(b)			1	Muscle;			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	8	(a)			1	Active {transport/ uptake};			
		(b)			2	Oxygen is needed; For respiration/ release of energy/ to make ATP; 2nd mark is linked to 1st			
		(c)			3	Water passes from where <u>it</u> is in high concentration to where <u>it</u> is in low concentration / Water passes from where solute concentration is low to where solute concentration is high ; Via a semi permeable membrane (or other correct description of membrane i.e. semi/ partially) ; Indication of where the higher concentration of water/ solute is;		SPM	
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	9	(a)	i		1	Transect (correct spelling);			
			ii		2	Quadrat (correct spelling); Tape measure/ {Tape/ rope} marked at (2) m intervals;			Ruler/ meter stick
		(b)			2	(2/25) x 100 = 8% Method; Answer; Correct answer on its own = 2			
		(c)			2	There is <u>less</u> light/ water/ minerals/ ions/ nutrients; Because of {<u>more/ most} competition</u> from the parent population;			Parent plant takes **all** (named resource) space
		Total Mark			7				

Question Number			
FT	HT	Mark	Answer
	10	6 QWC	Indicative content • 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 ▪ stopping adverts, ▪ banning smoking in public places, ▪ warnings on packets and increase in cost ▪ stopping the display of cigarettes in shops **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.
Total Mark		6	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
1		(a)			2	palisade; spongy;			sponge
		(b)	i		1	photosynthesis;			
			ii		1	carries sugar(s);	carries sucrose		carries glucose
			iii		1	respiration, starch;			
		(c)			1	<u>controls</u> {loss of water /transpiration}/ allows {gases/correctly named gas} to pass in or out/ allows gas exchange;	CO_2		Air CO^2
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
2		*(a)*	i		1	vena cava;	caval vein		
			ii		1	**two** correct arrows drawn; aorta arrow points to the body **X** arrow points to the heart;			
			iii		2	lungs; systemic;			systematic
		(b)	i		1	capillary;	capillaries		
			ii		2	walls are thin; so allow for diffusion;	walls one cell thick		
		Total Mark			7				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
3		(a)	i ii		2 1	plots correct ½ small square tolerance all correct = 2 marks 1 error = 1 mark >1 error = 0 marks Line;			
		(b)			1	94;			
		(c)	i		1	45 [bpm];			
			ii		2	(86/ 85) – (73/ 72) = 14/ 13/ 12; Correct answer = 2 marks Correct readings = 1 mark			
			iii		1	Person1 – returns to normal in shorter time/ Person 2 – shows a greater increase (after running);	Reverse arguments		
		(d)	i		1	More people/ repeats;			Fair testing
			ii		1	same age/ same level of {sporting activity/ fitness level}/ OWTTE;			Same sex
		Total Mark			10				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
4		(a)			3	B and <u>urine</u> out of kidney/ to bladder ; D and urethra (1) correct spelling only Bladder and {stores/holds} urine;	Keeps urine		
		(b)	i		1	Any **2** for **1** mark (excess) water, salt(s) and urea;	One correctly named salt		
			ii		1	Increased/ becomes stronger/ gets higher;			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
5		(a)	i		1	There were 800 tonnes 2001 and 1100 tonnes in 2011/ there is an increase from 2001 to 2011;			
			ii		2	(1 100 – 800)/10; 30 [tonnes per year]; Correct answer = 2 marks Incorrect answer but correct method = 1 mark			
			iii	I	1	break down plastic;		Feeding on plastic/ destroys plastic	
				II	1	pathogen / cause disease;		Releasing harmful chemicals	
			iv		2	phthalates/ organic toxins; could be taken up {by organisms/ in feeding/ in food chains} / bioaccumulation;		Poisons organisms	
		(b)			1	ethanol/ alcohol;	Carbon dioxide		
		Total Mark			8				

<table>
<tr><th colspan="2">Question Number</th><th colspan="4"></th><th></th><th></th><th></th><th></th></tr>
<tr><th>FT</th><th>HT</th><th colspan="4">Sub-section</th><th>Mark</th><th>Answer</th><th>Accept</th><th>Neutral answer</th><th>Do not accept</th></tr>
<tr><td>6</td><td>1</td><td colspan="3">(a)</td><td></td><td>3</td><td><table><tr><th>Field</th><th>Signs of mineral nutrient deficiencies shown by the wheat plants</th></tr><tr><td>A</td><td>poor growth/ reduces growth;</td></tr><tr><td>B</td><td>yellowing of leaves;</td></tr><tr><td>C</td><td>poor root growth;</td></tr></table></td><td>Stunted growth/ reduces growth of stems and roots</td><td></td><td>Reduces growth of stems/ reduces growth of roots</td></tr>
<tr><td></td><td></td><td colspan="3">(b)</td><td></td><td>1</td><td>{Spread/ spray/use/ add} {<u>NPK/</u> <u>fertilizer/ slurry/ manure</u>};</td><td>Green manure/ clover/ legume crops being ploughed in</td><td></td><td>Fertilising the plant</td></tr>
<tr><td></td><td></td><td colspan="4">Total Mark</td><td>4</td><td></td><td></td><td></td><td></td></tr>
</table>

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
7	**2**	(a)			2	A choroid; B optic nerve;	Phonetic spelling B: sclera/ sclerotic		
		(b)			Max 4	• In Diagram I the eye is in dim light; • iris (muscle) makes pupil larger; • to allow more light into the eye; • (In Diagram 2) the eye is in bright light and the reverse has happened (OWTTE); OR • In Diagram 2 the eye is in bright light; • iris (muscle) makes pupil smaller ; • to reduce the amount of light entering the eye; • In Diagram I the eye is in dim light and the reverse has happened (OWTTE);			
		Total Mark			6				

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
8	**3**	(a)	i		1	**B** **A** **D** **C**	B in the top row, A in the second, D in the third C in the fourth		
			ii		1	To prevent {entry / exit} of bacteria/ contamination by bacteria;	micro-organisms/ fungi/ microbes as alternative to bacteria		
		(b)	i		3	PLATE 1 10 °C; PLATE 2 4 °C; PLATE 3 35 °C;			
			ii		1	7;			7 colonies
			iii		2	bacteria on the inoculating loop would not have been killed/ loop would not have been sterilised; therefore the agar would have {bacteria/ micro-organisms} growing on it which would have <u>not come from the milk</u>/ contaminated with bacteria <u>not from the milk</u>; OR the loop is flamed to ensure all micro-organisms on it are killed; only bacteria from the milk are grown;	micro-organisms/ fungi/ microbes as alternative to bacteria		Loop not clean
		Total Mark			8				

Question Number			
FT	HT	Mark	Answer
9	**4**	6 QWC	*Indicative content:* • platelets form a blood clot • which seals the wound/ stops the bleeding • to prevent entry of microbes/bacteria • white blood cells/phagocytes {ingest/engulf} microbes/bacteria NOT destroy • white blood cells/lymphocytes produce antibodies* • which inactivate certain bacteria/microbes/viruses • white blood cells/lymphocytes produce antitoxins* • which inactivate/counteract toxins released by bacteria/microbes *Needed for top band **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.
Total Mark		6	

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	5	(a)			2	A pulmonary artery; B vena cava;		anterior/ posterior/ inferior/superior	
		(b)			4	• blood flows between left and right ventricles; • {both sides of heart/both ventricles} contain a mixture of oxygenated and deoxygenated blood (OWTTE)/left ventricle will contain partially oxygenated blood; • blood {sent to body/ in the aorta} will {be partially oxygenated/ have less oxygen than it should have}; • resulting in not enough oxygen supplied to cells/tissues/organs/muscles;			Blood leaving left ventricle/ going to the body is deoxygenated
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	6	(a)			1	<u>controls</u>{loss of water /transpiration} **and** allows {gases/correctly named gas} to pass in or out ;			
		(b)			1	Guard cells;			
		(c)			1	To prevent loss of too much water/ reduces loss of water;			Stops loss of water
		(d)	i		1	Decrease/ less time;			
			ii		1	Increase/ more time;			
		Total Mark			5				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	7	(a)			1	<u>Decrease</u> in water (in blood) / low water content (of blood)/ increase in concentration of blood;			Lack of water
		(b)			3	More water (re)absorb<u>ed</u>; Into the {blood/ capillaries}; Urine {becomes more concentrated/ contains less water};		Smaller volume	
		Total Mark			4				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	8	(a)	i		2	X = <u>Renal</u> artery; Y = <u>Renal</u> vein;	Afferent/ efferent		
			ii		1	Clots would clog the pump/ stop blood flow/ prevent blockage;			
			iii		1	Diffusion/ ultrafiltration;			
			iv		1	{maintains/ increases} concentration gradient/ allows {<u>maximum/greatest</u>} rate of diffusion or removal of waste;			
		(b)			1	Have a kidney transplant;	peritoneal dialysis		
		Total Mark			6				

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
	9	(a)	i		1	For comparison/ some regions have higher populations than others;			
			ii		2	50 – 8 = 42; 42/50 x 100 = 84%; Correct answer = 2 marks			
			iii		1	{Higher number of <u>deaths per 100 000/</u> higher percentage die} (in Africa);	ORA		
		(b)			4	Vaccine contains the antigen; Causes memory cells to be produced; For future invasions of bacteria; by {<u>rapid</u> production/ production of <u>large numbers</u>} of antibodies;			
		(c)			1	<u>Bacteria</u> develop <u>resistance</u> to <u>antibiotics</u>/ fewer people vaccinated;		overuse of antibiotics/ not completing course of antibiotics	Bacteria resistant to vaccine/ Bacteria are immune to antibiotics
		Total Mark			9				

Question Number			
FT	HT	Mark	Answer
	10	6 QWC	Indicative content • rapid involuntary protective response (to a stimulus) • light is the stimulus • retina is the receptor • sensory neurone sends the impulse to the relay neurone (Spinal cord = neutral) • via a synapse • impulse passes along the motor neurone • to the <u>muscle of the eyelid</u> which is the effector **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.
Total Mark		6	

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