

Mark Scheme for June 2012

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Subject-specific Marking Instructions

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
allow	answers that can be accepted
not	answers which are not worthy of credit
reject	answers which are not worthy of credit
ignore	statements which are irrelevant
()	words which are not essential to gain credit
<u> </u>	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	error carried forward
AW	alternative wording
ora	or reverse argument

Question			Answer	Marks	Guidance
1	(a)	(i)	absorb / take in (sun) light (1)	1	allow make food / glucose / starch ignore to absorb sun
		(ii)	no light underground / roots cannot photosynthesise (1)	1	allow roots are underground / roots are in dark allow idea that (sun)light cannot get to roots ignore sun can't get to roots ignore they can't absorb sunlight
	(b)	(i)	yellow (leaves) (1)	1	allow pale green / yellowy green / yellowy orange / yellowy brown ignore 'pale' / discoloured ignore less growth (in question) / smaller ignore brown / orange
		(ii)	fertiliser (1)	1	allow manure / compost / magnesium salts / named magnesium salt ignore just 'NPK' ignore just 'minerals' ignore other named minerals e.g. phosphates
	(c)		make food / photosynthesise / convert light energy into chemical energy (1)	1	allow they produce food ignore they are producers
			Total	5	

Question		Answer	Marks	Guidance
2	(a)	<p>record / measure how far / fast the bubble moves (1)</p> <p>description of how to change the light intensity (1)</p> <p>idea of control of other variables (1)</p>	3	<p>allow measure how much water is taken up or lost(1)</p> <p>ignore repeat with different light intensities unless qualified e.g. move lamp / repeat in the dark</p> <p>e.g. use the same plant / keep the temperature the same (1) e.g. place the apparatus in the light for set amount of time (1)</p> <p>allow make repeats at each light intensity (1)</p>
	(b)	<p>any two from:</p> <p>movement of food substances / sugar (and water) (1)</p> <p>through phloem (1)</p> <p>movement is up and down plant / AW (1)</p> <p>does not involve stomata or does not involve evaporation / loss of water or not affected by wind speed / humidity (1)</p>	2	<p>assume unqualified answers refer to translocation</p> <p>allow any named sugar not movement of minerals (negates first marking point) ignore nutrients (unclear if food or minerals) ignore other named foods e.g. starch ignore references to just water moving</p> <p>not phloem and xylem</p> <p>ignore just 'not affected by external factors' ignore not affected by temperature</p> <p>allow reverse argument if it clearly refers to transpiration: transpiration moves minerals (1) transpiration moves through xylem (1) transpiration is only up the plant (1) transpiration involves stomata / evaporation / water loss (1) allow additional mark for higher level answer referring to role of ATP / respiration / active transport (1) ignore just 'involves / needs energy'</p>
Total			5	

Question			Answer	Marks	Guidance
3	(a)	(i)	5 (%) (2) if answer incorrect $90 \div 1800 \times 100$ (1)	2	allow 0.05 (1) only if percentage sign is crossed out
		(ii)	(idea of energy being lost through) faeces / egestion / excretion / urine / respiration / movement / maintaining body temperature / not all parts eaten / not all organisms eaten (1)	1	allow clear examples of movement e.g. hunting ignore just 'waste' allow heat allow keeping warm ignore conduction / convection / radiation not growth (negates any mark)
	(b)	(i)	(decrease) less food (1)	1	must be idea of less food not just shrews eat insects or insects have been killed e.g. not enough food / not many insect to eat / killed of the insects which shrews feed on (1) but shrews eat insects or killed insects (0) allow correct ideas about bioaccumulation ignore kill them allow increase because they have more seeds to eat
		(ii)	(no) organic farmers don't use chemicals / insecticides (1)	1	ignore reference to man made substances ignore not using fertilisers but allow not using chemical fertilisers allow reverse argument e.g. farmer is using chemicals / pesticides
			Total	5	

Question		Answer	Marks	Guidance	
4	(a)		2	minus one mark for more than two boxes ticked to a minimum of zero	
		water is absorbed through the waxy cuticle			
		water evaporates from the leaves			✓
		water enters the leaves through pores			
		water is needed to stop the plant wilting			✓
		water is turned into oxygen during respiration			
		(2)			
	(b)	biological (1)	1	allow predation	
	(c)	drying(1) adding salt (1) adding vinegar (1)	2	ignore freezing / cooling / adding sugar / canning / fridge / air tight container / put in a jar / put in dry place allow pickling as an alternative to adding vinegar (1) allow cooking (1) allow bottling (1) allow put in oil (1)	
		Total	5		

Question		Answer	Marks	Guidance
5	(a)	decreasing / getting thinner / breaking down / passing out of the vagina (1)	1	allow period / menstruation
	(b)	(i) ovaries (1)	1	
		(ii) joining / fusion of a sperm and an egg (1)	1	allow joining / fusing of (male and female) gametes allow sperm enters egg ignore egg and sperm meet
	(c)	Joanna (1)	1	more than 1 answer = 0
		Total	4	

Question		Answer	Marks	Guidance
6	(a)	(i) X-ray (machine) (1)	1	allow CT machine / NMR
		(ii) ball (and socket) (1)	1	allow synovial / universal joint (1) ignore moveable
		(iii) ligament (1)	1	
	(b)	15(%)	1	
	(c)	(i) suggest surgery AND the point 72,15 indicated on the graph (1)	1	ON SCORIS, MARK THE UPPER ANSWER. THE LOWER QUESTION IS SHOWN TO ALLOW FOR ECF FROM (b) allow 1 for correct ECF need to see line(s) / cross / clear indication on graph to award mark
		(ii) more likely to advise reducing risk / less likely to suggest surgery (1)	1	ignore just 'advise reducing risk' ignore less likely to need surgery (as get older) allow less likely to get surgery (as get older)
		Total	6	

Question			Answer	Marks	Guidance
7	(a)	(i)	lung (1)	1	more than 1 answer = 0
		(ii)	<p>respiration is releasing energy (from food) (1)</p> <p>breathing is movements that draw air in and out of the lungs (1)</p>	2	<p>max one mark if they only describe respiration or breathing</p> <p>allow idea of respiration being a chemical reaction e.g. correct equation for respiration(1) e.g. creates / makes carbon dioxide (and water) (1) e.g. reacts oxygen and glucose(1)</p> <p>allow happens in cells (1) ignore makes / creates energy</p> <p>allow exhaling and inhaling (air)</p> <p>but not exhaling carbon dioxide and inhaling oxygen ignore gas exchange</p>
	(b)		kidney (1)	1	more than 1 answer = 0
	(c)		asthma / bronchitis / pneumonia / (lung) cancer (1)	1	<p>allow asbestosis / cystic fibrosis / emphysema / TB / silicosis / COPD ignore other types of cancer e.g. throat / mouth cancer</p>
			Total	5	

Question		Answer	Marks	Guidance	
8	(a)		2	RHS correct = one mark LHS correct = one mark	
	(b)	(i)	pulmonary artery (1)	1	
		(ii)	muscle (1)	1	
	(c)	(only) one atrium / ventricle (v two) / two chambers (v four) / one artery leaving (v two) (1)	1	assume unqualified answers refer to fish heart allow reverse argument if applies to human heart, e.g. human heart has two atria etc allow it doesn't have two atria / two ventricles / four chambers / two arteries allow it has no right ventricle / left ventricle / left atrium / right atrium (i.e. implies just one) ignore references to veins ignore references to thickness of ventricle wall allow one way only / single circulatory or humans are double circulatory	
			Total	5	

Question			Answer	Marks	Guidance
9	(a)	(i)	(cell) wall (1)	1	allow slime / capsule not membrane
		(ii)	movement / AW (1)	1	allow to swim
		(iii)	nucleus / mitochondria (1)	1	allow chromosome(s) ignore vacuole allow higher level answer e.g. ER / Golgi bodies
(b)	(i)	tuberculosis (1)	1	more than 1 answer = 0	
	(ii)	tuberculosis (1)	1	more than 1 answer = 0 no ecf	
	(iii)	800 (1)	1		
(c)	(i)	rotting / decay / decomposition (1)	1	allow higher level answers: putrefaction / saprophytism ignore digests them / eats them / breakdown	
	(ii)	plants (1)	1	allow denitrifying bacteria	
			Total	8	

Question		Answer	Marks	Guidance
10	(a)	<p>temperature was too high / temperature should have been lower (1)</p> <p>(biological washing) powder contains enzyme(s) / enzymes work best (at lower temperature) (1)</p>	2	<p>allow idea that he should have used a temperature in range 20-50 (°C)</p> <p>allow higher level answer: enzymes denatured at high temperatures / 60 °C</p> <p>ignore kill enzymes</p> <p>mark both parts together</p>
	(b)	(i)	2	<p>allow stick for strip</p> <p>allow diabetes(test) strip / glucose (test) strip</p> <p>but not just 'test strip' / indicator strip</p> <p>allow specific colour change e.g. goes blue</p> <p>allow compare to scale</p> <p>allow taste urine (1) sweet (taste) if glucose / sugar present (1)</p> <p>for 2 marks both points must be correctly linked</p>
		(ii)	2	<p>only need to mention DNA / gene once</p> <p>e.g. remove gene / DNA from human (cell)</p> <p>insert into bacteria (cell) (2)</p>
			Total	6

Question			Answer	Marks	Guidance
11	(a)	(i)	all three points correctly plotted (30,38) (35,35) (40,6) (1) one smooth curve going through all 5 points (1)	2	allow +/- 0.5 small squares for both points and line not straight lines point to point not multiple lines ignore line before 20°C and above 40°C
		(ii)	Liz (no mark) (the best temperature) could be (just) below or (just) above 30 (°C) or (the best temperature) could be anywhere above 25 and below 35 (°C) / anywhere between 25 and 35 (°C) (1)	1	If state Paul then score 0 allow (the best temperature) is close to / about 30(°C) (but not exactly) allow any numbers > 25 and < 35(°C) allow any range > 25 and < 35(°C), e.g. 30-34 but the answer “any number from 25 to 35 (°C)” = 0 allow Liz (no mark) not enough data (near optimum) allow Liz (no mark) only did experiment once so cannot be sure allow Liz (no mark) do not know margin of error
		(iii)	idea of (compromise between the need for a high rate of fermentation and) the costs incurred by maintaining a high temperature (1)	1	allow less energy / heat needed ignore just ‘cheaper’ / ‘more cost effective’ allow heat produced (during fermentation) allow so can control alcohol concentration / content allow so process completes in a known time (to prevent secondary fermentation in bottles) ignore just ‘control the rate of reaction’ allow to get less alcohol

Question		Answer	Marks	Guidance	
	(b)	(i)			
		<p style="text-align: center;">(1)</p>	1	all correct 1 mark	
		(ii)	sugar (1)	1	allow named sugar ignore starch
			Total	6	

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