

# **Mark Scheme for January 2013**

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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 <b>not</b> given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

**Abbreviations, annotations and conventions used in the detailed Mark Scheme.**

- / = 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
- = 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)	C (1) <b>any two from:</b> loses most / more water (1) most / more transpiration / evaporation (1) C has a much larger surface area / leaf surface (1) has most / more leaves (1)	3	If don't give C, then 0 marks for whole question <b>ignore</b> needs more or most water / uses more or most water <b>ignore</b> bigger plant / bigger roots / bigger leaves  need the idea of more/most but only need mention once, e.g. 'more leaves for evaporation' = 2
	(b)	minerals / nutrients / nitrates / magnesium (1)	1	<b>ignore</b> food / soil <b>allow</b> fertiliser / eg of fertiliser
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
2	(a) (i)	slugs (1)	1	<b>ignore</b> pests
	(ii)	idea that more crop produced (1) OR less / no lettuce being eaten (1)	1	<b>allow</b> improve yield / bigger lettuces <b>allow</b> improve quality / less damage <b>allow</b> lettuce has more chance of surviving
	(b) (i)	dandelions (1)	1	<b>ignore</b> box hedge <b>ignore</b> weeds
	(ii)	idea that more crop produced (1)  OR  less / no competition for light / water / space / other valid example (1)	1	<b>allow</b> improve yield / bigger lettuces <b>allow</b> improve quality / less damage <b>allow</b> lettuce has more chance of surviving  <b>ignore</b> stops them suffocating <b>allow</b> gets more light / water / space
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
3	(a)	bacteria / fungi (1)	1	<b>allow</b> valid example <b>allow</b> microbes / microorganisms <b>ignore</b> detritivores / examples of detritivores
	(b)	warm(er) (1)	1	<b>allow</b> hotter / hot <b>allow</b> reverse argument e.g. colder in winter <b>ignore</b> lighter / brighter / sunnier / sun / sunshine <b>allow</b> more decomposers
<b>Total</b>			<b>2</b>	

Question		Answer	Marks	Guidance
4	(a) (i)	make own food / photosynthesise (1)	1	<b>allow</b> produce food <b>ignore</b> it is at the bottom / start of food chain
	(ii)	(get food) by eating (other things) (1)	1	<b>ignore</b> consumes others / consumes food <b>ignore</b> hunts <b>ignore</b> eats producer
	(b) (i)	90 (kJ) (1)	1	<b>ignore</b> working mark answer on line first, if answer not on line then look for answer in working
	(ii)	<b>any one from:</b> less because more used for growth / growing more / still growing / growing faster (1)  less because less active / not hunting (1)  more because more active / playing (1)  more because greater SA:vol ratio (1)  more because less through waste / feeding on milk / more digestible food (1)	1	need both difference and explanation  assume unqualified answer refers to cubs <b>but allow</b> converse argument if they clearly refer to adults  <b>ignore</b> less heat lost because cub is smaller
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
5	(a)	<p>3 correct (2) 1 or 2 correct (1)</p>	2	if more than 3 lines drawn, deduct 1 mark for each incorrect line (minimum = 0)

Question	Answer	Marks	Guidance
(b)	<p><b>any two from:</b></p> <p>wide / broad / large surface (area) – to absorb light / energy (1)</p> <p>chlorophyll / chloroplasts – to absorb light (1)</p> <p>thin – for gas exchange / absorb CO<sub>2</sub> / release O<sub>2</sub> / diffusion of gases / movement of gases (1)</p> <p>veins – to transport sugar / food / water(1)</p> <p>stomata/pores – for gas exchange / absorb CO<sub>2</sub> / release O<sub>2</sub> / diffusion of gases (1)</p>	2	<p>assume it refers to leaves  <b>ignore</b> references simply to flowers / plants  <b>ignore</b> photosynthesis in answers since in question</p> <p><b>allow</b> sunlight / sun's rays / sun's energy <b>but ignore</b> sun  <b>ignore</b> flat / big / large leaves  <b>allow</b> catch / capture / exposed to / hit by / take in light <b>but ignore</b> attracts light</p> <p><b>ignore</b> chlorophyll for photosynthesis  <b>ignore</b> green  <b>allow</b> higher level answers eg more chlorophyll near top surface of leaf to absorb light / energy</p> <p><b>allow</b> xylem to transport water  <b>allow</b> phloem to transport sugar / food  <b>ignore</b> phloem to transport water</p> <p><b>allow</b> correct reference to arrangement ie avoid overlapping – to absorb light (1)  <b>allow</b> correct reference to orientation ie leaves move towards light – to absorb light (1)  <b>allow</b> transparent epidermis to allow light to enter leaf (1)  <b>ignore</b> cuticle</p>
(c)	<p><b>any two from:</b></p> <p>evaporation (inside leaf) (1)</p> <p>diffusion (outside) (1)</p> <p>through stomata / pores / between guard cells (1)</p>	2	
	<b>Total</b>	<b>6</b>	

Question		Answer	Marks	Guidance
6	(a)	egg(s) and sperm (1) join together (1)	2	<b>allow</b> higher level answers eg nuclei fuse =2 <b>allow</b> ovum / female and male gametes <b>allow</b> sperm enters egg =2 <b>ignore</b> 'meets' e.g. egg and sperm meet =1 but egg and sperm meet and join =2
	(b)	ovary / ovaries (1)	1	
	(c)	testis / testes (1)	1	
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
7	(a)	bronchiole (1)	1	more than one answer (0)
	(b)	(i) releasing energy (from food/sugar) (1)	1	<b>allow</b> correct word or symbol equation (balancing not necessary) or correct description of equation in words <b>allow</b> oxidation of food <b>not</b> produce / make energy
		(ii) moving air in <u>and</u> out (of lungs) (1)	1	<b>allow</b> ventilation / expiration <u>and</u> inspiration / inhalation <u>and</u> exhalation (1) <b>ignore</b> any mention of taking in oxygen and letting out carbon dioxide
	(c)	water / H <sub>2</sub> O / carbon dioxide / CO <sub>2</sub> (1)	1	<b>allow</b> water vapour (1)
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
8	(a) (i)	add up and divide by number of values / add up and divide by 3 / $51 \div 3$ (1)	1	
	(ii)	$17 \times 4$ (1) BUT 68 (2)	2	correct answer, no working = 2
	(iii)	heart beat / heart pumping / heart contracting / heart muscle contracting (1)	1	<b>allow</b> higher level answers eg ventricles contract / arteries recoil <b>allow</b> change of blood flow / pressure (in artery) <b>not</b> vein <b>ignore</b> just 'heart' <b>ignore</b> just 'blood being pumped'
	(b) (i)	red (blood cell) (1)	1	
	(ii)	white (blood cell) (1)	1	<b>allow</b> higher level answers eg named type of WBC
<b>Total</b>			<b>6</b>	

Question		Answer	Marks	Guidance
9	(a)	<b>any three from:</b> homeostasis ideas: regulate water loss / control blood concentration / removes excess water / removes excess salts (1)  filter <b>blood</b> (1)  (at high) pressure (1)  re-absorb water / useful substances (1)  remove urea / waste products from blood (1)  make urine (1)	3	<b>ignore</b> filter fluids  <b>allow</b> 'ultrafiltration' = 2  <b>allow</b> named examples eg sugar / amino acids / salts <b>allow</b> higher level answer e.g. selective reabsorption = 1 <b>ignore</b> clean blood / remove waste from body <b>ignore</b> removes toxins <b>ignore</b> excretes urine <b>ignore</b> just excretion

Question		Answer	Marks	Guidance
	(b) (i)	<p><b>any two from:</b></p> <p>same or similar tissue match / DNA / blood group / genes / antigens (1)</p> <p>not or less likely to be rejected / will not need (so many) anti rejection drugs (1)</p> <p>same size / similar size / same age (1)</p> <p>she knows her sister's health / lifestyle (1)</p> <p>idea that there waiting lists / (suitable) donors are difficult to find (1)</p>	2	<p><b>allow</b> clear reverse arguments for each marking point e.g. (unknown) donor will have different DNA etc</p> <p><b>allow</b> more likely to be accepted</p> <p><b>ignore</b> similar age</p>
	(ii)	(kidney machines are) too big (1)	1	<b>ignore</b> simply 'not enough room'
<b>Total</b>			<b>6</b>	

Question		Answer	Marks	Guidance
10	(a)	flagellum (1) and cell wall (1) correctly labelled	2	
	(b)	yoghurt / vinegar / silage / compost (1)	1	<p><b>allow</b> any correct suggestion eg insulin</p> <p><b>ignore</b> wine / beer / alcohol</p>
	(c)	<p><b>any two from:</b></p> <p>(through) nose / breathing in (1)</p> <p>(through) mouth / in food / in drink (1)</p> <p>(through) skin / cuts / bites / infected needles (1)</p> <p>(through) reproductive organs / sex (1)</p>	2	

Question		Answer	Marks	Guidance
	(d)	flu is caused by a virus / antibiotics do not work against viruses / antibiotics only kill bacteria (and some fungi) (1)	1	<b>allow</b> flu is not caused by bacteria
<b>Total</b>			<b>6</b>	

Question		Answer	Marks	Guidance
11	(a)	clintix / reagent strip/(1) turns purple / blue (1)  OR  (heat with) Benedict's solution (1) turns green / yellow / red orange (1)	2	results must match test  <b>allow</b> biosensor (1) correct observation eg current change (1)
	(b)	genetic engineering (1)	1	<b>allow</b> GM / genetic modification
<b>Total</b>			<b>3</b>	

Question		Answer	Marks	Guidance
12	(a)	phytoplankton (1)	1	
	(b)	anchorage (1)	1	
	(c)	from farms / horticulture / soil / fields / sprayed onto crops (1) (via) rivers / streams / run-off / leaching (1)	2	<b>allow</b> via sewers <b>allow</b> rain washes them into sea
<b>Total</b>			<b>4</b>	

Question			Answer	Marks	Guidance
13	(a)	(i)	B (1)	1	
		(ii)	line rising up but never above the existing line (1)	1	<b>ignore</b> whether line eventually reaches existing line
	(b)	(i)	glucose / sugar (1) carbon dioxide (1)	2	<b>allow</b> formulae if correct / any other named sugar (1)
		(ii)	fermentation (1)	1	
	(c)		<b>any two from:</b> no / less carbon dioxide produced / less global warming / less greenhouse effect (1)  less sulfur dioxide produced / less nitrogen oxides produced / less acid rain (1)  no / less particulates (1)  less fossil fuels used / less petrol used which is non-renewable / ethanol is renewable / sustainable / petrol won't run out so quickly (1)	2	<b>ignore</b> just less pollution          <b>ignore</b> gasohol is renewable / sustainable <b>ignore</b> simply 'petrol is non-renewable'
			<b>Total</b>	<b>7</b>	

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