

MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers

0610 BIOLOGY

0610/62

Paper 6 (Alternative to Practical), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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

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Question	Mark scheme	Guidance / comments
1 (a)	<p>Complete table with cells neatly drawn;</p> <p>Columns or rows headed S1, S2, S3;</p> <p>Column or row headed drops of iodine solution;</p> <p>Correct results (22, 6, 11);</p>	<p>If no table drawn, mark other parts independently if appropriately laid out but if bar chart / histogram MAX 2</p> <p>Reject cells not drawn completely / headings outside cells / obviously unruled lines</p> <p>Table can be either way round</p> <p>Accept 0.2%, 0.05%, ?/ unknown if S1, S2 and S3 are not present in the table</p> <p>Ignore drops alone / iodine without solution Reject if drops appears in the body of the table</p> <p>Ignore tally without numbers</p>
(b)	<p>0.09% – 0.11%;</p> <p>Correct use of 11 drops for S3;</p> <p>Correct reference to drops and concentration (for S1 or S2);</p>	<p>Incorrect percentage = 0 If no percentage given Accept S3 (concentration) in between S1 and S2 or S3 (concentration) less than S1 / 0.2% or S3 (concentration) greater than S2 / 0.05%</p> <p>If 11 drops not mentioned Accept number of drops for S3 = half number for S1 / number of drops for S3 = double number for S2</p> <p>N.B. Can refer to conc. and number of drops separately or together anywhere in answer.</p> <p>Accept as an alternative – calculation of ratio of drops : concentration even if S1 / S2 are not specifically mentioned</p>

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(c)	<p>Four marks from:</p> <p>Repeats / replicates the original experiment / AW;</p> <p>Average / mean;</p> <p>Use more precise instrument to measure volume of drops;</p> <p>Measure volume in cm³ not drops alone;</p> <p>Use a colorimeter / white card to judge colour / AW;</p> <p>Narrow the range between the concentrations on either side of unknown / increase concentrations between S1 and S2 / AW;</p> <p>Control variables (iodine solution / starch solution / size of tubes); MAX [4]</p>	<p>Ignore repeat experiment with different conditions</p> <p>Accept syringe / burette / (Pasteur) pipette Ignore measuring cylinder Measure cm³ with a burette = 2 marks</p> <p>Ignore 'more concentrations' alone</p> <p>Ignore temperature, stirring, pH, time Ignore apparatus alone</p>
(d) (i)	<p>O – Orientation;</p> <p>A – Axes labels;</p> <p>S – Scale;</p> <p>P – Plots – correct heights of columns;</p> <p>L – Line – neat columns;</p> <p>[5]</p>	<p>O – 'x' axis – juices and 'y' axis – number of drops of iodine solution</p> <p>A – accept as minimum 'drops' and named fruit (juices) without general fruit juice label</p> <p>S – columns plotted to fill greater than half of grid</p> <p>P – deduct mark for any incorrect</p> <p>L – ruler used and columns of equal width</p> <p>If line graph allow O, A and S only MAX [3]</p>
(ii)	<p>Blackcurrant</p> <p>[1]</p>	
	[Total: 17]	

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2 (a) (i)	<p>O – single clear lines;</p> <p>S – larger than photograph;</p> <p>N – number of segments drawn;</p> <p>D – detail / markings within at least 3 segments;</p> <p>A – appendages on opposite sides of at least 6 segments;</p> <p style="text-align: right;">[5]</p>	<p>Reject sketched / artistic lines</p> <p>Reject shading</p> <p>Accept 11 / 12 / 13 segments (not including the head)</p> <p>Segments must be distinct / discrete / complete</p> <p>Accept even if sketchy or shaded or incomplete</p>
(ii)	<p>Fig 2.1 larva = 8.3 +/- 0.1 cm / 83 +/- 1 mm;</p> <p>Length of larva in drawing in mm / cm (+/- 1 mm or +/- 0.1 cm);</p> <p style="text-align: right;">[2]</p>	
(iii)	<p>correct magnification and X;;</p> <p style="text-align: right;">[2]</p>	<p>Accept correct answer for 2 marks even if no working shown</p> <p>Accept correct answers to any number decimal places (i.e. allow correctly rounded answers)</p> <p>Accept X before or after magnification / 'times'</p> <p>If answer incorrect (incorrectly calculated / no X / units used) then allow max 1 for correct working e.g. length of drawing / length of image (in words or figures)</p>

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(b) (i)	<p>Method Marks on grid or leaf to show it was used to calculate area of leaf / tubes;</p> <p>Working (area of tubes) = 3 to 20, (total area of leaf) = 55 to 60;</p> <p>Correct calculation to work out percentage / 3 to 20 / 55 to 60 x 100;</p> <p style="text-align: right;">[3]</p>	<p>It must be clear that method of adding squares and parts of squares on the grid to find total area was used. Accept obvious reference to number of squares and parts of squares(covered by leaf or tubes) in working</p> <p>Accept the formula in words 'area of tubes / total area of leaf multiplied by 100' if equation not expressed numerically Accept error carried forward from their figures</p>
(ii)	<p>Two marks from: Able to eat through palisade and spongy mesophyll;</p> <p>(Midrib too) tough / AW;</p> <p>Cannot get food out from within midrib;</p> <p>Correct reference to (tough) lignin / xylem (tubes);</p> <p style="text-align: right;">MAX [2]</p>	<p>Accept leaf blade, ignore leaf tissue</p> <p>Accept strong, thick, hard</p> <p>Ignore too little food in midrib</p> <p>Ignore phloem</p>
(iii)	<p>No / less photosynthesis (in damaged areas) / AW;</p> <p>Dries out / too much water lost / reduced water transported (to cells) / AW;</p> <p>Infected with fungi / bacteria / viruses / AW;</p> <p style="text-align: right;">MAX [2]</p>	<p>Accept valid descriptions e.g. less food made</p> <p>Ignore reduced transpiration / damage to stomata Ignore larva takes away water</p> <p>Accept disease</p>

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(c) (i)	<u>jointed</u> legs or appendages or limbs; [1]	Ignore exoskeleton (as not clear in fig.) / joined legs Reject if answer contains incorrect characteristics e.g. wings
(ii)	Three marks from: Head, thorax and abdomen / 3 parts to body; 1 pair antennae; 3 pairs legs; 2 pairs wings; MAX [3]	Ignore segments / body segments Ignore compound eyes
	[Total: 20]	
3 (a)	increases / dilates / AW; [1]	
(b)	Low(er) intensity / less light (enters eye) / to get more light into the eye / AW; Circular muscles (of iris) relax / lengthen; Radial muscles contract / shorten; MAX [2]	Accept room is darker Ignore references to ciliary / longitudinal muscles Ignore descriptions of reactions to full light / photograph A
	[Total: 3]	