

**MARK SCHEME for the October/November 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.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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Page 2	Mark Scheme; Teachers' version	Syllabus	Paper
	IGCSE – October/November 2011	0610	62

Question	Mark Scheme	Mark allocation	Guidance
1 (a)	<p>Drawing; shading;</p> <p><b>O</b> – clear outline of <b>whole</b> fruit, no shading;</p> <p><b>S</b> – size as large as photograph;</p> <p><b>W</b> – thickness of outer wall shown;</p> <p><b>A</b> – attachment of seeds / pattern;</p> <p><b>ONE</b> label; fruit wall / pericarp / epicarp / mesocarp / pulp / endocarp [if correct];</p>	[5]	<p>4 drawing marks.</p> <p>Ignore the boundary around the seed area as not distinct. No shading anywhere. Just for the outer line of the whole fruit.</p> <p>Photograph on printed paper 14.6 cm – so drawings more than 14.5 cm from tip of stalk to end of fruit = large. Lines to show the pale epicarp – should follow the 'contour' of the outside wall and be evenly spaced. At least 5 distinct seeds in correct arrangement plus others smaller in size. Mark with a tick in order.</p> <p>Fruit wall is the whole thickness = pericarp that is composed of epicarp [actual outer layer] + mesocarp [pulp] + endocarp [paler layer around the seed cavity]. Ignore if line for fruit wall is to epicarp only.</p> <p>A. exocarp [language].</p>
(b)	<p>shape – oval / flat / length larger than width / long and thin / accurate description of shape;</p> <p>edges of seed – ridged / thickened / reference to seal at edge;</p>	[2]	<p>Ignore: circular, curved, streamlined, tapered at both ends, references to top diagram as a section.</p>
(c)	<p><b>Two</b> labels from: cotyledon, plumule, radicle, hypocotyl, root hairs;;</p>	Max[2]	<p>plumule = above soil level to the cotyledons. A. phonetic spellings.</p> <p>radicle = below soil level.</p> <p>A. phonetic spellings hypocotyl = 0.5 cm ± either side of the soil line on Fig.1.3.</p> <p>Ignore shoot, root and other incorrect labels.</p>

<b>Page 3</b>	<b>Mark Scheme; Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE – October/November 2011</b>	<b>0610</b>	<b>62</b>

<b>(d)</b>	<p>extract from the tissue / grinding / crush seeds / AW; ONCE</p> <p>.....</p> <p><b>fat</b> (emulsion test): – add alcohol / ethanol / fat solvent / AW;</p> <p>pour or add to water <b>and</b> white (emulsion) cloudy / milky forms;</p> <p><b>starch</b>:—add iodine <b>solution</b>; brown / reddish-brown / orange / yellow to blue / black;</p>	<b>Max[4]</b>	<p>First mark applicable for <b>either</b> test <b>ONCE</b>. Take a sample / take a piece of seed – insufficient.</p> <p>Need solvent to be added before the water. Ignore reference to ‘emulsion’ alone need comment re. white / AW. Grease spot test – one mark only.</p> <p>A. iodine in potassium iodide, drops of iodine, Need starting colour as well as final colour.</p>
<b>(e)</b>	<p>medium to grow such as soil / cotton wool / blotting paper / paper; warm temperature / warmth / suitable specified temperature e.g. 15 to 30 °C;</p> <p>water / moisture /damp / rain / humid / wet / pre-soaking;</p> <p>oxygen / aerobic conditions;</p> <p>AVP – scraping seed coat to break dormancy / cold period e.g. vernalisation / fire for pyrophytes;</p>	<b>Max[4]</b>	<p>Ignore addition of fertilizers, minerals, etc.</p> <p>A. not too hot <b>and</b> too cold = warmth. A. not too humid <b>and</b> not too dry = damp. Both sides of the answer required for mark.</p> <p>Ignore air / carbon dioxide.</p> <p>Ignore references to light / pH / photosynthesis / time.</p>
		<b>[Total:17]</b>	

2 (a) (i)	<table border="1"> <tr> <td></td> <td>chip in salt solution</td> <td>chip in water</td> </tr> <tr> <td>length / mm</td> <td>55</td> <td>63;</td> </tr> <tr> <td>change / mm</td> <td>-5</td> <td>(+3);</td> </tr> </table>				chip in salt solution	chip in water	length / mm	55	63;	change / mm	-5	(+3);	<p>Mark per row for measurements. ± 1mm for measurements.</p> <p>Change must take into consideration the measurements – so allow <b>ecf</b>.</p> <p>Numerical answer required and –ive sign only is required or qualification in words e.g. gain 3 mm v loss 5 mm , smaller by 5 mm v larger 3 mm, AW.</p>			
		chip in salt solution	chip in water													
length / mm	55	63;														
change / mm	-5	(+3);														
[2]																
(ii)	<p><u>Osmosis;</u> Reference to partially or semi-permeable membrane;</p> <table border="1"> <tr> <td>feature</td> <td>in salt solution</td> <td>in water</td> </tr> <tr> <td>direction of water</td> <td><b>out</b> of chip;</td> <td><b>into</b> chip;</td> </tr> <tr> <td>gradient</td> <td>tissue has higher <math>\Psi</math>, less concentrated in salts or solution is lower <math>\Psi</math> or more concentrated, hypertonic</td> <td>tissue has lower <math>\Psi</math>, more concentrated in salts or solution is higher <math>\Psi</math> or less concentrated, hypotonic;</td> </tr> <tr> <td>state of tissue or chip</td> <td>flaccid or plasmolysed;</td> <td>turgid;</td> </tr> </table>			feature	in salt solution	in water	direction of water	<b>out</b> of chip;	<b>into</b> chip;	gradient	tissue has higher $\Psi$ , less concentrated in salts or solution is lower $\Psi$ or more concentrated, hypertonic	tissue has lower $\Psi$ , more concentrated in salts or solution is higher $\Psi$ or less concentrated, hypotonic;	state of tissue or chip	flaccid or plasmolysed;	turgid;	<p>[1] [1]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p> <p>Comparison required for mark.</p> <p>Comparison required for mark.</p> <p>Max[4]</p>
	feature	in salt solution	in water													
	direction of water	<b>out</b> of chip;	<b>into</b> chip;													
	gradient	tissue has higher $\Psi$ , less concentrated in salts or solution is lower $\Psi$ or more concentrated, hypertonic	tissue has lower $\Psi$ , more concentrated in salts or solution is higher $\Psi$ or less concentrated, hypotonic;													
state of tissue or chip	flaccid or plasmolysed;	turgid;														
[1]																
[1]																
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(b) (i)	(-) 9.66 or 9.65 %;			[1]												
(ii)	Difference in starting mass / the mass did not start the same / AW;			[1]												

<b>Page 5</b>	<b>Mark Scheme; Teachers' version</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE – October/November 2011</b>	<b>0610</b>	<b>62</b>

<b>(iii)</b>	<b>A</b> - label the numbers on both axes and –ive sign in front of numbers on the 'y' axis; <b>S</b> – scale;  <b>P</b> – plot;  <b>L</b> – smooth curve to join plots;	<b>[4]</b>	Bar chart – <b>A</b> and <b>S</b> . max 2. Even scale spaced across the grid so the curve fills half more than half for both 'x' and 'y' axes. A. scale on lower edge of grid for 'x' axis. Accurate to one small square on grid. A. ecf. <b>2 (b) (i)</b> . <b>R</b> . large points that cover more than one small square. If scale is inverted – negative values above and positive below, allow <b>S</b> , <b>P</b> and <b>L</b> to max 3.
<b>(c) (i)</b>	point where line crosses the 'x' axis – to fit graph in <b>2 (b) (iii)</b> ;	<b>[1]</b>	
<b>(ii)</b>	No net change / water entering = water leaving / $\Psi$ inside and outside the same / concentration is equal / isotonic / state of equilibrium;	<b>[1]</b>	Ignore 'no water movement', no osmosis, no diffusion, no water uptake or loss [not the idea of equal].
		<b>[Total:14]</b>	
<b>3 (a) (i)</b>	<b>3</b> body parts / head + thorax + abdomen;  <b>Two or one pair</b> of antennae; <b>six legs / three pairs</b> of (jointed) legs; <b>one pair / two</b> (compound) eyes;	<b>Max[3]</b>	Ignore segmented body, segmentation of the abdomen, 3 body segments, exoskeleton. Ignore antennae alone, 'things on head, feelers. Ignore 'same number of legs'. Need number to be qualified.
<b>(ii)</b>	<b>A</b> and <b>B</b> – one pair v two pairs of wings / length of abdomen / thickness of legs / AW; <b>A</b> and <b>C</b> – wings v no wings / C has no wings [alone] / A has wings [alone]	<b>Max[2]</b>	A. if only half of the answer is given e.g. B has 2 pairs of wings this implies that A doesn't. A. if mention number of wings. Ignore wings alone. Ignore different size but allow the shape of abdomen. Ignore length of leg comparison.
<b>(iii)</b>	Insects / Insecta ;	<b>[1]</b>	

Page 6	Mark Scheme; Teachers' version	Syllabus	Paper
	IGCSE – October/November 2011	0610	62

<p><b>(b)</b></p>	<p>Crustacean / Crustaceae; two pairs of antennae / claws, clamp or chelopeds / more than 6 legs or more than 3 pairs / hard or calcareous exoskeleton, hard covering or hard shell / tough covering AW;;</p> <p><b>or</b> Arachnids / Arachnida; 4 pairs or 8 legs / simple eyes / pedipalp / cephalothorax and abdomen or 2 body parts / AW;;</p> <p><b>or</b> Myriapods / Myriapoda; one or two pairs of legs per segment; elongate body;</p>	<p>[3]</p>	<p>If named an example e.g. crab instead of crustacean then no group name mark but accept up to 2 differences. Accept more than 3 pairs of legs, more than 1 pair of antennae. Ignore no wings / many legs / compound eyes / not one pair of antennae / body not divided into three parts.</p> <p>If named an example e.g. spider, scorpion, mites instead of arachnids then no group name mark but accept up to 2 differences. Ignore more than 3 pairs of legs. [need to know how many more. Ignore negative features e.g. no wings / no compound eyes / no antennae.</p> <p>Ignore no separate thorax and abdomen / no wings / many legs.</p> <p>If incorrect group given e.g. molluscs. No mark for group name but allow only <b>one</b> difference with insects but it must be a positive feature e.g. hard shell present in mollusc.</p> <p>Name of group = one mark. 2 marks for two correct differences in positive features. These three groups are the only ones listed in the syllabus.</p>
		<p>[Total:9]</p>	