UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0610 BIOLOGY

0610/52 Paper 5 (Practical Test), 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.

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Question	Mark scheme	Mark allocation	comments A = accept R = reject I = ignore AW = alternative wording to convey the same meaning ecf = error carried forward ORA = or reverse argument
1 (a) (i)	*table* complete table with cells **neatly** drawn; *headings* number of drops of iodine solution; **S1, S2, S3** / concentrations of vitamin C; *results* all result cells completed; in order of concentrations;	[5]	**I** absence of outer lines **A** 'number of drops' or 'drops' alone **A** 0.2% (**S1**), 0.05% (**S2**), unknown (**S3**) **S1** most drops, **S2** fewest drops, **S3** between **S1** and **S2.** **S1** 0.2% > **S3** 0.1% >**S2** 0.05%
(b)	Estimated numerical **S3** concentration; Correct use of the number of drops for **S3**; Correct reference to **S1** / **S2**, drops **and** concentration;	[3]	**ecf from (a) applies throughout** **A** calculations based on results / ecf from **(a)** **A** description in words / between 0.02% and .05% / between that of **S1** and **S2** / (lower than / same as S2 if it is a logical interpretation of the results) **A** description of order of concentrations as **ecf** from results in **1(a)** If number of drops not mentioned **A** number of drops for **S3** = half number for **S1** / number of drops for **S3** =double number for **S2** according to results ***N.B. Can refer to conc. and number of drops separately or together anywhere in answer.*** **S1** number of drops **and** 0.2 (%) / **S2** number of drops **and** 0.05 (%) **A** as an alternative – calculation of ratio of drops : concentration even if **S1** / **S2** are not specifically mentioned e.g. approx 1 drop : 0.01%

(c)	**Four marks from:** Repeats / replicates / AW; Average / mean; Use more **precise instrument** to measure volume of drops; measure volume of drops in **cm^3** not drops alone; Use a colorimeter / white card to judge colour / AW; Narrow the range between the concentrations on either side of unknown / increase concentrations between **S1** and **S2** / AW; Control variables (volume / concentration iodine solution / starch solution / size of tubes); AVP;	MAX [4]	2 or more **A** more finely graduated AW / syringe / burette / (Pasteur) pipette **I** measuring cylinder Measure **cm^3** with a burette = 2 **A** blue card for comparison **I** more concentrations unqualified **I** temperature, stirring, pH, time use larger samples / avoid mixing solutions e.g. use fresh syringes instead of washing them

(d) (i)	**O** – Orientation; **A** – Axes labels; **S** – Scale; **P** – Plots – correct heights of columns; **L** – Line – neat columns;	[5]	**O** '***x***' axis – juices and '***y***' axis – number of drops of iodine solution **A** minimum 'drops' and named fruit (juices) without general fruit juice label **S** columns plotted to fill greater than half of grid **L** ruler used and columns of equal width **A** columns touching or equally spaced or single vertical lines If line graph allow **O**, **A** and **S**, only **Max [3]**
(ii)	Blackcurrant;	[1]	
(iii)	In **(a)** the highest concentration took the most drops; Blackcurrant took the most drops;	[2]	**A** converse
		[Total: 20]	

2 (a) (i)	**O** – single clear outline and no shading; **S** – larger than photograph; **N** – number of segments drawn; **D** – detail / markings within some segments; **A** – appendages on opposite sides of at least 6 segments;	[5]	**A** 11 / 12 / 13 segments (not including the head) Segments must be distinct / discrete / complete **A** even if sketchy or shaded or incomplete (already penalised in **O** and **N**) These must be joined to body
(ii)	Fig 2.1 larva = 8.3 cm (+/– 0.1 cm) / 83 mm (+/– 1 mm); Length of larva in drawing in mm / cm;	[2]	**A** 82 – 84 inclusive + or – 1 mm Units to be given at least once
(iii)	correct magnification and X;;	[2]	**A** ecf from **(a)(ii)** **A** correct answer for 2 marks even if no working shown. **A** correct answers to any number decimal places (i.e. allow correctly rounded answers) **A** X before or after magnification / "times" ***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)

(b) (i)	***Method*** Marks on grid or leaf to show it was used to calculate area of leaf / tubes; ***Working*** (area of tubes / tunnels) = 3 to 20 + (total area of leaf) = 55 to 60; $\frac{\text{area of damage}}{\text{area of leaf}} \times 100$ / $\frac{3 \text{ to } 20}{55 \text{ to } 60} \times 100$;	[3]	It must be clear that method of adding squares and parts of squares on the grid to find the total area was used **A** area of grid – area not leaf = area of leaf **A** obvious reference to number of squares **and** parts of squares (covered by leaf or tubes) in working **A** the formula in words 'area of tubes / total area of leaf multiplied by 100' if equation not expressed numerically **A** **ecf** from their figures
(ii)	**Two marks from:** Able to eat through palisade and spongy mesophyll; (Midrib) (too) tough / AW / ORA mesophyll is softer; Cannot get food from midrib / ORA can get food from mesophyll; Reference to lignin / xylem (too tough) ; AVP;	MAX [2]	**A** tunnelling / eating **A** leaf blade **A** strong, thick or hard **I** too little food in midrib **I** phloem **A** larva would fall off if leaf support structure damaged
(iii)	**Two marks from:** No / less photosynthesis (in damaged areas) / AW; Dries out / too much water lost / water transported to cells reduced / AW; Infected with fungi / bacteria / viruses / AW; AVP;	MAX [2]	**A** descriptions e.g. less food made / less chlorophyll or chloroplasts / reduced leaf area **A** too little water (lack veins / damage to stomata) **I** reduced transpiration **A** reference to disease **A** reference to reduced transport e.g. minerals from soil reduced / sugars from plant not passed to leaf

(c) (i)	<u>jointed</u> legs;	[1]	**R** exoskeleton (as not clear in Fig.) / joined legs / incorrect structures – segmented body
(ii)	**Three marks from:** head thorax and abdomen / 3 body parts; 3 pairs of legs or 6 legs; 2 pairs of wings; 1 pair of antennae;	 Max [3]	**I** compound eyes / segments **A** 4 wings **R** 2 wings **A** 2 antennae
		[Total: 20]	