UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

0610 BIOLOGY

0610/06 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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General notes

Symbols used in mark scheme and guidance notes.

/ separates alternatives for a marking point

; separates points for the award of a mark

A accept – as a correct response

R reject – this is marked with a cross and any following correct statements do not gain any marks

I ignore/irrelevant/inadequate – this response gains no mark, but any following correct answers can gain marks.

( ) the word/phrase in brackets is not required to gain marks but sets context of response for credit. e.g. (waxy) cuticle. Waxy not needed but if it was described as a cellulose cuticle then no mark.

Small underlined words – this word only/must be spelled correctly

ORA or reverse argument/answer

ref./refs. answer makes appropriate reference to

AVP additional valid point (e.g. in comments)

AW alternative words of equivalent meaning

Question	Mark scheme	Comments
1 (a) (i)	description of curvature in 0.8M; description of curvature in 0.0M; [2]	for 0.8M **A** first / left ; for 0.0M **A** second / right; **A** curve / bends; outer layer; inner layer **0.8M** inwards; outside / convex; inside / concave/ shrunk / shrink; hollow in **0.0M** outwards; inside / concave; outside/convex/ expanded; hollow out ***I*** *thicker wall; thinner wall*
(ii)	1 <u>osmosis;</u> 2 loss of water / exosmosis in 0.8 molar salt solution; 3 reference to (cells)shrinking / becoming flaccid / plasmolysed; 4 increase in water / endosmosis in 0.0 molar; 5 reference to (cells) swelling / becoming turgid; 6 definition of osmosis (must refer to gradient and sp membrane); 7 wax / waterproof layer / impermeable; [MAX 4]	**R** salt movement Points 2 + 3 and points 4 + 5 are linked **A** water conc. / salt conc. / hyper or hypo tonic in a correct context **A** salt solution. – as reference to 0.8 molar
(b)	1 range of salt solutions / different concs; 2 same time; 3 same plant / type / species / dandelion; 4 same size / length / mass at start; 5 measure curvature / no change (in mass / curvature); 6 plot graph of conc against change in length; 7 repeat (experiment / more stems per conc); [MAX 4]	Points 1 and 2 are not valid for 0.0M and 0.8M only, need 3 **A** 30 mins minimum **I** temp / conditions **I** reference to control
	[Total: 10]	

2 (a)	Drawing: 1 flower as in fig. 2.1; 2 no shading / artistic lines; . . . . . . Label: 1 three stamens / anthers + filaments / anthers; 2 stigma / style; 3 petals; 4 sepal; 5 ovary; [MAX 6]	**A** + or – petals / floral parts separate (even if receptacle is not drawn.) **R** stylised flowers **A** all labels on stylised diagrams label line to touch surface / inside / curved part one on left must have double lines either side and can be labelled to base of receptacle label marks = MAX 4 but MAX 2 for stylised diagrams
(b)	stamen / anther / filament is outside / hanging / loosely attached; long / bendy filament; style / stigma is feathery / furry / large SA / long / large AW; [3]	**I** labels (but can accept e.c.f. from diagram) **A** pollen sacs **I** sticky / outside / exposed **I** pollen (not visible) / pistil / carpel alone **I** negative comments e.g. no nectaries / petals / smell
(c) (i)	**one** similarity: both have stamens / anthers / stigmas; [1]	
(ii)	Fig. 2.1: petals; stamens / anthers enclosed within petals / firmly attached; stigma / style enclosed within petals; stigma /style is small / curved / single Fig.2.2: Not present; stamens / anthers exposed / outside / loosely attached; stigma / style outside the flower; stigma / style has large SA / large / feathery / hairy / multiple; [4]	need to be matched pairs LIST rule **I** size / colour / scent **A** filament can be comparative **I** sticky **I** carpel **A** male + female parts are inside / outside flower = 1 need both, do not award if stigma/stamen given
	[Total: 14]	

3 (a) (i)	Graph: O orientation and label of axes; S suitable scale to fill > 1/2 grid; P plot points; L neat line passing through plotted points; [4]	bar chart = MAX 1 for Orientation mark pH on X–axis (ignore PH) and time/ s on Y-axis; judged by plotted points and scale should be linear including broken axis. +/- 0.5 square for all points / line point to point ruled line or smooth curve passing through all points. No extrapolation of line.
(ii)	record optimum / 7 – faster / best; increase rate, pH 3-7 / more alkaline **or** decrease rate, pH 7 – 3 / more acidic; decrease rate, pH 7-8 /more alkaline **or** increase rate, pH 8 – 7 / more acidic / less alkaline; AVP; [MAX 2]	If refer to extreme pH's **only** – Max 1 i.e. rate decreases from pH 7 to pH 3 and 8 e.g. can't be exactly sure of optimum as not enough points around pH 7
(b)	Four from: 1. control temperature; 2. same size of apparatus / tube; 3. same size / type / mass of paper / concentration of catalase; 4. buffer; 5. more sophisticated timer / stopwatch / data logger; 6. safety features includes use forceps to handle pieces of paper / goggles / gloves / lab coats / AW; 7. repeats; 8. volume of oxygen measured / collected; 9. increase intermediate pH / values between 3 and 8; [MAX 4]	If all conditions and environment the same allow Max 1 for Points 1 & 2. **I** clean apparatus **A** find average / two people **I** increase range of pH unqualified / increasing at extremities.

(c)	1. one pH; 2. range of temperatures; 3. control temperature e.g. keep tubes in water bath throughout investigation / same temperature; 4. equilibrate tubes in different water baths for 5 mins – way of achieving temperature before starting; 5. same volume / concentration of hydrogen peroxide; 6. same enzyme source or concentration / same size or type or mass of filter paper; 7. same size of tubing / apparatus / test tube; 8. repeats / find average; 9. volume of oxygen measured / plot a graph of activity; 10. safety features: includes use forceps to handle pieces of paper / goggles / gloves / lab coat / AW; [MAX 6]	any pH to show control. **A** High to Low / different temperatures / at least 3 / cold & warm & hot. **A** area / amount of filter paper **I** clean or sterilised apparatus
	[Total: 16]	