UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

5090 BIOLOGY

5090/62 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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1 (a) (i) Graph marks:
1. temperature on *x* axis, depth on *y* axis with correct linear scales ;
2. axes labelled: temperature/^{o}C, depth/mm ;
3. plots clear and accurate ;
4. good smooth line of best fit ; [4]

(ii) optimum 36 ^{o}C – 40 ^{o}C ;
depth 43 – 45 mm ; (answers according to graph drawn) [2]

(iii) no foam / no bubbles / no reaction / no product / no gas / no oxygen / no change ;
enzyme <u>denatured</u> / <u>deactivated</u> / deformed / description of effect on active site ; [2]

(b) (i) increase friction / abrasion AW ;
to break cells open / release cell contents / release enzyme ; [2]

(ii) glowing / smouldering splint ;
relights / rekindles / burns more brightly ; [2]

(c) (i) repeat (investigation) and find mean / average result ;
use temperatures near the optimum / between 35 ^{o}C – 45 ^{o}C ;
take measurements at smaller temperature intervals ; [max 2]

(ii) **1.** repeat (investigation) and find mean result ; if not awarded in **(c)(i)**
2. better method of measuring gas evolved / use gas pipette / AW;
3. use constant volume or concentration of substrate ;
4. use constant volume or concentration of enzyme ;
5. each temperature kept constant ;
6. accurate time measurement / timed for same length of time ;
7. OVP e.g. maintain constant pH / use enzyme from same source throughout ; [max 4]

[Total: 18]

2 (a) (i) **A** (leaf) epidermis / epidermal cell ;
B <u>guard cell</u>
C red blood cell / erythrocyte ; R. rbc
D white blood cell / leucocyte / polymorph / phagocyte / granulocyte / lymphocyte / neutrophil ; R. wbc [4]

(ii) **A** protective / waterproof (covering) ;
B (control) opening or closing of stoma / gaseous exchange / transpiration ;
C transport / carry oxygen ;
D phagocytosis / destroy bacteria / destroy pathogens / prevent infection / produce antibodies / neutralise toxins / tissue rejection ; [4]

(b) **1.** peel off epidermis / make impression of leaf surface (with nail varnish or wax);
2. place on (microscope) slide with mountant / stain ; R. ink
3. use cover slip ;
4. prevent air bubbles forming ;
5. use of microscope ; [max 3]

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(c) (i) Drawing marks:
both cells drawn with clean lines and realistic shape at least 4.0 cms ;
thinner area indicated in **C** + good lobed nucleus in **D** ;
Label mark:
either depression in C or nucleus in D + cytoplasm or cell membrane in either ;
R. if nucleus in C or chloroplast in D [3]

(ii) 2 measurements with correct units (once) with indication of where taken (on Fig. 2.2 or on drawing) (max. length of D on Fig. 2.2 = 15 – 17 mm) ;
correct method of calculation ;
evidence of correct allowance for ×800 ;
magnification correct and well expressed ; [4]

(d)

feature	cell **A**	cell **D**
(cell) size	large	small
shape	irregular / indefinite / AW	regular / oval / definite AW
nucleus (size)	small	large
nucleus (shape)	round / circular / AW	lobed / irregular / AW
arrangement	joined to other cells / AW	separate / AW
(numbers)	one of many similar / AW	only one of its kind / AW

One mark per line [max 4]

[Total: 22]

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