UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2008 question paper

5090 BIOLOGY

5090/06 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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1 (a)

test–tube / no.	total surface area / cm^2	time taken for colour change / s [/ min]
1	6	510 [8.5]
2	12	45 [0.75]
3	8	225 [3.75]

marks: 1 format as shown **A**: horizontal or vertical and extra column(s)
2 table ruled and joined up
3 titles and units as appropriate in headers
4 surface area calculations correct
5 all boxes completed **R**: mixed minutes and seconds [5]

(b) (i) graph marks: [5]
1 axes correct (*x* – surface area / volume – horizontal)
2 labelled 'surface area / volume (ratio)' and 'time / seconds' (t / s)
3 correct (equal spaced) scale, good size
4 plots **clear** and accurate
5 good line of best fit / ruled connections
bar: 1 and 2 only

(ii) bigger surface area (volume ratio) – shorter time / faster diffusion rate ; [1]
A: inversely proportional

(c) determination of end point ; **R**: 'timing'
accuracy of block size ;
effect on surface area of blocks clumping ;
ovp ; e.g. ensure blocks covered by **A2** [up to 2]

(d) living cell has (cell) membrane ;
materials moved through (semi-permeable) membrane / active transport ; **R**: osmosis
cytoplasm (of uneven density) ;
uneven / variable shape ; (c.f. cube)
ovp ; [up to 2]

(e) apparatus assembled correctly (diagram to include thermometer) ;
same size / surface area blocks of agar ;
different (static) temperatures ;
range of temperatures suggested (2 will do, **R**: boiling) ;
record results /data / plot graphs ;
same volume of **A2** ;
replication / repeats / mean values ;
ovp ; e.g. temperature constant before blocks put in [up to 6]

[Total: 21]

2 (a) (i) drawing marks: [D.2]
1 clear, clean lobes, at least 7 cm
2 variegation shown (not just shaded)

labels: 2 correct from –
green and white / yellow areas / variegated chlorophyll absent / present ;
vein ;
lamina ; [up to 2]

(ii) width of **L1** 67–68 mm ;
line drawn and correctly measured, units correct once ; [2]

(iii) working expression correct ; **A**: stated in words
magnification correct and well expressed ; [2]
up to 2 d.p., not more than 0.2 rounding up/down

(b) (i) increases permeability / denatures enzymes / stops reactions /
/ kills cells/leaf ; **R**: kill enzymes [1]

(ii) remove chlorophyll / decolourise ; **R**: chloroplasts [1]

(iii) test for starch ; [1]

(c) starch produced where chlorophyll present ;
white area produces no starch ; **A**: converse
chlorophyll harnesses light / energy (for photosynthesis) ;
another detail – e.g. need to decolourise ; [up to 3]

(d) drawing marks: [D.3]
1 complete section, at least 7 cm deep, clear and realistic
2 upper cuticle ± correct
3 stoma shown – 2 guard cells correct

labels:
2 from: stoma(ta), guard cell, epidermis, cuticle ; [1]
2 from: palisade, spongy, air (intercellular) space, mesophyll ; [1]

[Total: 19]