UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

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, 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) add iodine ; **R** if heated
(blue)-<u>black</u> if <u>starch</u> present ; **R** substrate

(ii) <u>heat / warm with Benedict's</u> ;
R unqualified water bath. **R** non-reducing
red / orange / yellow if reducing sugar / glucose present ; [4]

(b) (i) Graph marks: [5]
1 pH on x axis, time / on y ;
2 x axis: pH, correctly numbered, y time / sec. ; **A** t / s
3 clear, correct plotting ; **R** if from 0
4 well joined, ruled or smooth best fit ;
5 curves identified ;
One curve only – allow 1, 2 and 4
Bar chart – allow 1 and 5 only

(ii) optimum (etc.) pH 4 ;
same for both ;
pH has similar effect with or without salt /
/ slower at extremes / time decreases then increases ;
speeded up / time decreases with salt ; (at all pH values) [max 4]

(c) replication ;
investigate narrower pH range ;
same concentration / volume / amount / batch of enzyme ;
same concentration / volume / amount of substrate ;
same iodine / Benedict's treatment ;
same temperature ; **R** ref. heat
add equal volume / 1 cm^3 of water equivalent to salt solution added ;
(same) stirring ;
clean apparatus before use ;
ensure accurate pH ; [max 5]

[Total: 18]

2 (a) **A** – coccus ;
B – bacillus / rod ; [2]

(b) (i) lactose / milk sugar ; **R** glucose [1]

(ii) lactose → lactic acid ; [1]

(c) boil then cool milk ;
mix the 2 components ;
keep at suitable temperature 35°–45° ;
for 12–48 hours (etc.) ;
repeat / multiply up ;
[max 2]

[Total: 6]

3 (a) Mark this section as a whole

Drawing marks:
1 Attempts at all three, fairly realistic ;
2 Good; double lines, minimal shading etc.
3 At least 2 labels from testa / leaves / root (hairs) ;

Measurements:
1 Accurate and consistent units, decimal place if cm ;
2 Realistic for either Fig. 3.1 or drawings ;

Description / labels:
4 correct from:
Ref. colour – white (ish) / pale v dark green / brown ;
Ref. relative lengths of axes ;
2 / large leaves in **B** ; **A** converse
Shoot / plumule / axis in **B** clear / well developed ;
Seed **C** not germinated / no growth ; **R** dead / bad
Ref. pattern on testa of **C** ;
AVP e.g. ref. etiolation / chlorosis in **A** ;

[max 8]

(b) (i) in light – chlorophyll – so photosynthesis ; **A** converse
unlike etiololated / pale / yellow **A** ; [2]

(ii) ref. <u>enzyme</u> action at low temperature / 4° ; **R** deactivation
(energy released) at higher temp / 20°C for germination / growth ; [2]

(c) (i) <u>mitosis</u> ; [1]

(ii) chromosome / chromatid ; R: chromatin / DNA / nucleus [1]

(iii) not specialised (for different functions), AW ; [1]
1 from: ± same shape / size ; no vacuoles ; frequent divisions ; [1]

[Total: 16]