

**MARK SCHEME for the May/June 2010 question paper  
for the guidance of teachers**

**5090 BIOLOGY**

**5090/31**

Paper 3 (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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) (i) S1**
- |                               |   |                       |         |
|-------------------------------|---|-----------------------|---------|
| green                         | – | yellow ;              |         |
| uniform colour                | – | blotchy/spotted ;     |         |
| smooth                        | – | rough AW ;            |         |
| firm                          | – | soft ;                |         |
| well defined section          | – | less clear lines AW ; |         |
| skin/pericarp/epicarp thicker | – | comparative smell ;   | [3 max] |
- (ii) S1** blacker than **S2** ;  
**S1** contains (more) starch ;  
comment on distribution ; [2 max]
- (b) (i)** equal samples of each ;  
prepare sample ;  
heated with Benedict's solution ; **R** 37°  
in water-bath ;  
ref. (equal) volume of Benedict's/equal heating time ;  
comparative result described – more +ve for **S2** ; [4 max]
- (ii)** in table:  
observations: **S1** green – yellow ; **S2** yellow/orange – red ;  
conclusion: less reducing sugar in **S1**/no difference ; [3]
- (c)** less starch in **S2** than **S1** ;  
more reducing sugar in **S2** than **S1** ; [2]
- (d) (i) S1** darker/more discoloured ;  
**S2** darker/more discoloured ;  
**S3** 'no change' in both/lighter ; [3]
- (ii)** acid conditions – pH effect on enzymes/metabolism ;  
ref. ripening ; [2]
- (iii)** 3 or more pieces of banana taken ;  
from each type of specimen ;  
placed in range of solutions of different pH (acid & alkali etc) ;  
leave for e.g. 15 min ;  
compare/observe changes ;  
OVP ; same temperature/test for starch & reducing sugar ; [4 max]

**[Total: 23]**

|               |                                       |                 |              |
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- 2 (a)** drawing marks:  
 head, (thorax) and abdomen cleanly drawn, min 7 cm ;  
 6 legs, reasonably correct orientation ; **A** 3 if lateral view  
 segments shown on/abdomen/leg/antenna ; [3]
- labels:  
 head (thorax) and abdomen ;  
 antenna(e) ; **R** feelers  
 (compound) eyes ;  
 OVP ; e.g. wing/leg/segment/exoskeleton [2 max]
- (b) (i) & (ii)** length of beetle, length of drawing, place indicated ;  
 expression using these figures ;  
 magnification properly expressed ; **R** if expression inverted. [3]  
**A** up to 2 d.p. **R** rounding above 0.2
- (c) (i)** in Table 2.1:  
 number for **B** (at least 5) ; number for **C** ; [2]
- (ii)** application of formula ;  
 correct calculation, based on **(i)** ; (30 minimum) [2]
- (iii)** appropriate numbers given ; [1]
- (d) (i)** 16 ; [1]
- (ii)** bar chart :  
 axes correct and labelled ;  
 accurate plotting in equal, ruled columns ; [2]
- (iii)** AVP such as : predator/prey/moisture/light intensity/  
 other environmental preference ; **R** 'suitable' [1]

**[Total: 17]**