

**MARK SCHEME for the October/November 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) (ii) fault or variation may give odd result / confirms first reading / avoiding any errors;  
R: ref to accuracy / fair testing [1]
- (iii) yes – because of differences (or converse);  
ref. to average / mean length;  
(this can also be accepted in (ii) if not referred to here). [2]
- (iv) marks for Table 1.1: (tick close to point)  
negative change in **A**;  
positive change in **C**;  
means correctly calculated and stated;  
(+) and – indicated in last column; [4]
- (b) (i) graph marks:
1. labelled (+) above, – below axis.
  2. x-axis labelled 'concentration / mol per dm<sup>3</sup>.'
  3. y-axis labelled 'change in length / mm'.
  4. clear and accurate plotting of own data.
  5. connections ruled / line of best fit. [5]
- (ii) accurately read from graph ( $\pm 1$  mm on x-axis);  
units (mol per dm<sup>3</sup>); [2]
- (iii) water potential the same (equal) / solution in cell(sap) same concentration as external (ambient) solution ; isotonic;  
no net exchange of water;  
no change in length / size / dimensions; [3 max]
- (c) investigate adjacent (more / different) values of concentration / using concentration in (b) (ii);  
more accurate measurement of strips; replication / more strips;  
measure mass; longer time; [3 max]
- [Total: 20]**

- 2 (a) (i) drawing marks:
1. at least 6 cm, clear and realistic.
  2. legs (jointed / sections), wings (2), with one veined.
  3. segments (clear / complete) / head / eye / proboscis shown. [3]
- labels: leg and wing;  
head / thorax / abdomen;  
segment;  
proboscis / antenna;  
eye; [3 max]
- (ii) better outline / clear(er) / shows more detail;  
holds in place / keeps flatter / spread out; [2]

|               |  |                 |              |
|---------------|--|-----------------|--------------|
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(iii) shown where measured;  
 measurements with units once at least;  
 correct calculation – drawing over specimen size;  
 magnification well expressed;  
 R: 3 decimal places. [4]

(b) (i) wings; veined; eyes;  
 jointed / segmented; antennae;  
 legs; head / thorax / abdomen; [4 max]

(ii) comparable but contrasted pairs:

|                           |   |                                |
|---------------------------|---|--------------------------------|
| small size / 1 cm         | : | large(r) / 10 cm;              |
| wings 2 (1 pair)          | : | wings 4 (2 pairs);             |
| delicate / thin / shorter | : | stronger / longer wings;       |
| small(er) head / eyes     | : | larg(er) head / eyes;          |
| small / thin / long legs  | : | stout / stronger / short legs; |
| proboscis                 | ; | no proboscis                   |
| abdomen (tail) rounded    | ; | abdomen (tail) pointed         |
| long antenna              | ; | short antenna                  |

[4 max]

**[Total: 20]**