

## **MARK SCHEME for the May/June 2007 question paper**

### **0610 BIOLOGY**

**0610/06**

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.

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

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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**1 (a) (i)/(ii)**

All measurements in mm;						
seedling	4°C		30°C			
	agreed	range	with fine roots		without fine roots	
			agreed	range	agreed	range
<b>1</b>	<b>12</b>	<b>11–13</b>	<b>92</b>	<b>91–93</b>	<b>78</b>	<b>77–79</b>
<b>2</b>	<b>10</b>	<b>9–11</b>	<b>67</b>	<b>66–68</b>	<b>56</b>	<b>55–57</b>
<b>3</b>	<b>11</b>	<b>10–12</b>	<b>69</b>	<b>68–70</b>	<b>52</b>	<b>51–53</b>
<b>4</b>	<b>14</b>	<b>13–15</b>	<b>78</b>	<b>77–79</b>	<b>65</b>	<b>64–66</b>
<b>5</b>	<b>10</b>	<b>9–11</b>	<b>79</b>	<b>78–80</b>	<b>76</b>	<b>75–77</b>
<b>mean</b>	<b>11.4</b>	<b>10–12.4</b>	<b>77</b>	<b>76–78</b>	<b>65.4</b>	<b>64–66.4</b>

One mark for each column, measurements within tolerance or consistent error e.g.  $\times 10$ ;;  
One error no mark for that column.

One mark for correct units;

Units mark given if measurement given as mm

Reject if used cms / if numbers out by factor of ten / if put mm by measurements.

Incomplete seedling measurements max 1 for units only

[3]

(ii) add totals and calculation of means correct;;

If both means wrong then check for working and allow 1 mark;

If one mean only correct 1 mark .

If measurements totally wrong then check their working if correct allow both marks and allow ecf (still a tolerance of plus or minus 1mm)

[2]

(b) (i) *general point* greater / more / faster / better length/growth / development / cell division in 30°C or converse; ignore germination

*explanation* enzyme / reactions / activity / metabolism faster or converse;

AVP; detail of enzyme activity

allow one from each row

	4°C		30°C	
shoot / stem / stalk / plumule	not visible / present	<b>OR</b>	present / elongated / longer / present	;
leaf	not visible / present	<b>OR</b>	developed / present	;
testa / seed coat <i>ignore coat alone</i>	still present	<b>OR</b>	(some) detached	;
root / radicle	not developed	<b>OR</b>	developed / side roots <i>ignore root hairs</i>	;

Use of data ; credit once only

Ignore refs to root hairs / colour references

[max 6]

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- (ii) variation / reliability / reduce (percentage) error / reproducible / to eliminate differences / mutation / AW ;

*[ignore accurate or precise / mean or to average / fair test]* [1]

**[Total:12]**

- 2 (a) Drawing : **S** size same or bigger;  
**O** clear continuous lines; *reject if shaded*  
**D** detail (10 segments);  
*ignore shaded in mouth / anus*

ONE Label: **L** segments / sections /  
mouth / head / anus (accept at either end) /  
outer covering /  
(tail) spikes /  
spiracles / breathing holes;  
*ignore antennae / feelers / tentacles – credit one correct label*

[max 4]

- (b) (i) Arthropod / insect; accept dipteran  
*must be correctly spelt*  
*ignore invertebrates / fly*

[1]

- (ii) six legs / three pairs of legs/limbs;  
three parts / sections to body / head + thorax + abdomen;  
compound eyes;  
one pair of antennae; *ignore 'feelers'*  
wings;  
jointed / segmented limbs; *ignore joined*

*ignore mouth parts / hairs / 3 segments in body*  
*mark first three list order*

[max 3]

- (c) (i) **O** orientation; (*x axis – temperature*)  
**A** axes labelled + units; *accept time in days and temp ° C*  
**S** equal / even scale; *plots use more than half the graph, even with 2 lines. If non linear scale used – do not allow plot.*  
**P** plot; [of pupa to adult only] *+/- half a square, one wrong no mark*  
**L** clear, unbroken line; *accept point to point or a curve through all points + / -21 °C.*

*R extrapolation or added bits of graph / line of best fit*  
**O and A** only for columns whether bar chart or histograms  
*ignore second line if both drawn.*

[max 5]

- (ii) development quicker at higher temperatures or converse;  
*from graph pupa to adult*

metabolism / respiration / enzyme activity faster / AW quicker or accept the converse;  
comparison of larva / 2.3 to pupa / 2.4.the temp has greater effect  
vs pupa / 2.4 to adult / 2.2; *from table*

[3]

**[Total:16]**

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- 3 (a) (i) circle around the dividing cells showing separation of 'daughter' chromosomes from the equator of cell in anaphase;

*[there are 3 possible cells which might be chosen]  
if more than one circled – then all need to be correct.* [1]

- (ii) square / regular / rectangular cells;  
chromosomes / chromatids; *however expressed*  
no nuclear membrane / no nucleus;  
*ignore other structures* [max 2]

- (iii) mitosis; *be careful with spelling* [1]

- (b) cells grow / increase in length;  
cells begin to specialise / differentiate / develop / more complex AW;

*(to become xylem or phloem etc) Ignore divide again. Root grows is in question* [2]

**[Total: 6]**

- 4
1. separate sample for each test;
  2. equal volume of each sample;
  3. simple sugars :- Benedict's ;
    4. heat / boil; *ignore warm*
    5. stays blue is negative
    6. blue to green / yellow / orange / brown / red / AW;
  7. protein:- biuret or sodium/potassium hydroxide + copper sulphate;
    8. blue to mauve / purple/violet;
  9. repeat;
  10. safety -not tasting;
  11. general safety point;

Accept *as alternative to points above*

3a	clinitix;
6a	pink to purple;
7a	albusitix;
8a	yellow to green;

*Reject colour changes if reagents totally wrong e.g. iodine / sodium chloride*

*Accept inaccurate spelling for name of test or reagents if recognisable  
If not recognisable, but cannot be confused, then accept the colour change but not for test or reagent.* [max 6]

**[Total: 6]**