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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2007 question paper

9700 BIOLOGY

9700/05 Paper 5 (Practical 2), maximum raw mark 30

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.

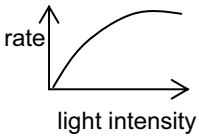
Mark schemes must be read in conjunction with the question papers and the report on the examination.

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

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) (i) axes correctly orientated and labelled;
line showing a rise and then a plateau; [2]



(ii) 3 of;
1. lamp with variable intensity/different wattage;
2. filters of different density; allow paper/fabric correctly described
3. lamp with same intensity, moved different distances;
4. different number of lamps at the same distance; [3]

Reject – colour filters/different locations/foil, muslin, light combinations

(iii) 1 of:
remove any alginate/calcium chloride/sodium chloride;
remove (non-immobilised) algae;
Reject – clean [1]

(b) (i) 3 of: (*looking for a method of using the indicator*)

add (hydrogen carbonate) indicator to algal balls;
same volume/concentration of indicator (if replicates set up);
correctly qualified colour change (purple if carbon dioxide has decreased/photosynthesis has occurred);
ref. to time and colour change; (fixed time and note colour/fixed colour and note time) [3]

(ii) **reliability**:
several/3 or more consecutive readings/set up several replicates at each intensity and take mean/obtain consistent readings/remove anomalies; [1]

accuracy:
make a range of solutions of known carbon dioxide/hydrogen carbonate concentration;
compare the colour of the test solution;

OR

use a colorimeter;
light transmission/absorbance reading used/
allows determination of exact end point; [2]

Allow any suitable method for this procedure

[Total 12]

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2 (a) (i) (mean before = 0.17(ms)
mean after = 0.15(ms)
% = $\frac{0.02}{0.17} \times 100$)

= 12(%); [1]

(ii) dependent – reaction time;
independent – caffeine/coffee (concentration); [2]

(iii) 3 of: (*Note 3 factors = 1 mark*)

1. age;
2. sex/gender;
3. time after drinking coffee/time taken to drink coffee;
4. time of day when tested;
5. previous caffeine/coffee intake;
6. use of other stimulants/named stimulant/depressants/named depressant;
7. tolerance/addiction;
8. body size/mass;
9. food consumption;
10. state of health;
11. genetic/race/ethnicity;
12. metabolism. [1]

(b) support

1. mean values show decrease; Allow the mean value quoted
2. all individuals except B/one (person) show a decrease;

Allow as reverse argument

does not support

3. only 8 subjects/small sample size;
4. no repeats;
5. non-representative sample (age or gender);
6. some of 'before' results are similar to 'after' results;
7. only one concentration of caffeine tested/no range;
8. no evidence for any other age group;
9. no statistical test carried out (to check significance of results). [4]

If only one side considered max 3

[Total: 8]

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3 (a) (i) Grazing has no effect on the size of the moth population/moth population is the same size irrespective of grazing; [1]

(ii) Columns of numbers correct;;;

Site	O	E	$(O - E)^2$	$\frac{(O-E)^2}{E}$
Presently grazed	36	80	1936	24.2
Ungrazed 10 years	90	80	100	1.25
Ungrazed 30 years	114	80	1156	14.45

[3]

Allow E = 114
incorrect values in column E – no mark for that column
Allow error carried forward to columns $(O-E)^2$ and $\frac{(O-E)^2}{E}$ [1]

(iii) X^2 = 39.9/58.42;
Allow error carried forward on candidates own figures correctly added.
Allow correct rounding up to max. 2 sig. figs. [1]

(b) (i) 2; [1]

(ii) 0.001/< 0.001;
Allow: <0.05/reference to percentages

Error carried forward on candidates own X^2 value and degrees of freedom
Treat frequencies that include 0.10 – non-significant, 0.05 – significant
Reject of degrees of freedom are outside the table of values

(iii) 3 of;
1. value indicates that result is significant/not due to chance/reject the null hypothesis; Reject unqualified difference
2. (grazing is) causing the population of moths to decrease;
3. plants preferred by moths eaten/variety of plants reduced/habitat destruction;
4. increase in predators/parasites with grazing;
5. fewer places to lay eggs/hibernate;
6. likely to become extinct (if grazing increased as already a rare species); [3]

Error carried forward:
Allow reverse arguments that are consistent with the candidate's probability.
Allow max. 1 for arguments that support an incorrect interpretation of the candidate's probability.
Allow max. 2 for explanations with no figures.

[Total: 10]

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