

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2003

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 0610/06

BIOLOGY
(Alternative to Practical)



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Question 1

(a) (i) Graph

- O** - axes to show correct orientation;
- S** - suitable scale to fill the printed grid; [at 10 mins scale should cover 2½ large squares]
- L** - label axes correctly with appropriate unit;
- P + P** - correct plotting [minus 1 for 1 error, minus 2 for 2 errors]
- D** - ruled straight lines from point to point / smooth line of best fit [R. wavy lines. No extrapolation back to axes. Allow extra line past 10 min for label line]
- K** - identify lines by labels or use of a key;

Histogram allow **L, O, K** to max 3.

[7]

(ii) temperature drops faster at first / AW;
temperature continues to drop but slower / AW;
but if A loses heat with no further detail, max 1 mark
no credit for a description comparing A with B and C

[2]

(iii) reference to one tube having dropped more / lower / faster than another;
A compared with B / A compared with C / B compared with C;
(if just final temperatures given with no working = 0)

(iv) reference to animals or tubes *with idea of* transfer of heat/trap warm air/keep them warm
/maintain body temperature;
use of appropriate scientific term – insulation/conduction/radiation/convection;

[2]

(b) shield tubes from draughts/move apparatus out of draught;
use of lids [to reduce loss of heat from too exposed surface];
stir the water before taking temperature reading;
replication/average/ accept measure more tubes in outer ring C;
more frequent readings; [*ignore longer periods*]

R. leave longer/use more test tubes or larger groups/use of animals or blood instead of water/lagging tubes/alter volume of water.

MAX [2]

[Total: 15]

Question 2

(a) (i) **Drawing:** **clear outline of whole animal;** *R sketchy outlines and excessive artistic shading*
proportions; *R. obvious gross errors/extra detail not present*
e.g. open carapace
detail; *check 3 parts to body and 3 pairs of segmented legs.*

Labels: *number and structure for 1 mark*
6 legs/3 pairs/6 jointed appendages;
2 antennae/feelers; *R. anthers/tentacles;*
3 parts to body / head and thorax and abdomen;
R. segmented body alone
2 pairs of wings (accept 1 pair of wings / wing covers)
ignore mouthparts/carpace/hard case.

MAX [5]

(ii) measurement of Fig 2.1 3 to 4.2 cm max. AND
measurement of the candidate's drawingcm [to include units **once**];
working to calculate magnification;
magnification;
check answer, must be times or x in front of figure without units.
if answer is incorrect look for correct working accept a ratio if correct

[3]

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(b) **TWO** precautions and explanations from:-

traps must be checked early and regularly;
so animals do not become eaten/escape;

use of suitable fluid;
to kill the insects/to stop carnivorous insects/predators/large animals eating beetles;

suitable covering/mesh;
animals washed away/eaten; rain;

container deep enough/grease sides of pit;
so beetles cannot escape/trap insects;

R. bait/food to attract insects/identification of insects/exit holes for rain/glass pits/position of pits/gap around tin/sharp edge/use of gloves. MAX [4]

(c) **THREE** visible differences between beetle in Fig. 2.1 and the butterfly in Fig. 2.3

Need points from **both** insects to be compared – statements **MUST** be paired.

Feature	Beetle fig 2.1	Butterfly fig 2.3
wings	one pair / no wings / folded wings	2 pairs of wings [alone] / bigger / visible wings / unfolded / upright wings;
wing covers	present	wings exposed / absent;
antennae (<i>accept ecf for incorrect name already penalised</i>)	shorter / smaller / no swellings / segmented	longer / larger / swellings at tip / not segmented;
mouthparts	pincers / claws / piercing parts / AW	proboscis / tongue / sucking;
eyes	none / not visible / small <i>R. simple eyes</i>	compound / visible / large;
body	accept small	accept large;
abdomen	not visible (<i>accept not segmented segments not visible</i>)	visible / segmented; <i>R. striped/shaded</i>
legs	hairy / claws <i>R. length of legs</i>	not hairy / no claws;

MAX [3]

[Total: 15]

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Question 3

- (a) Award 1 + 1 mark in pairs (i.e. second mark can only be awarded with its own first mark)
 ONE of:-
 Cover with petroleum jelly;..... Plant will not wilt;
 Cover with polythene bag/bell jar/bottle;..... condensation/drops of water will collect; R. water vapour
 Use of photometer;..... bubble movement/level of capillary water;
 Shoot in container;..... water taken up; [needs for water to be covered with oil to prevent evaporation/covered with polythene].
 Cobalt chloride paper;..... colour change – to pink;
 Anhydrous copper sulphate...colour change – to blue; *R. litmus/universal indicator* [2]
- (b) to prevent / minimise loss of moisture / water from the soil / pot by evaporation; [1]
- (c) similar apparatus including same sized/mass plants/equal number of leaves; *ignore ref. to same bags*
 same conditions of water added before starting investigation;
 same time for readings/one day;
 same conditions of light;
 same temperature;
 same humidity;
 same air movement;
 data analysis/comparison of graphs;
if candidate describes a different experiment, then max 2 for 2 controlled conditions MAX [4]

(d)

feature	description	comment relating to adaptation
leaves	no leaves / small leaves / small surface area / spines / thorns; hairs [or stem or plant];	to reduce water loss / transpiration; for protection / to prevent being grazed / eaten; to trap water;
stem (<i>R.</i> bulb)	swollen / thick / fleshy / succulent; green / ref. chlorophyll;	stores water; for photosynthesis [as leaf area reduced];
cuticle / skin	thick/waxy; <i>R. hard alone</i>	stops water loss;
roots	long / tap; shallow / network / fibrous / many roots;	to trap / absorb water from deep; to trap/absorb water over wide area; <i>R. store water</i>
hairs/spines	on stem / plant / surface;	traps moist air; reduce transpiration;
stomata	not in direct light / sunken / less in number;	reduce water loss / reduce transpiration;
plant shape	width / thickness / less surface area to volume ratio / reduce surface area; <i>ignore compact</i>	stores water / reduce water loss;

3 valid features without adaptation comment = max 1

R. big roots / main root / light reflecting / shiny / ribs / grooves

MAX [3]

[Total: 10]