

Edexcel IGCSE

Biology

4325: 1F, 2H & 03

November 2006

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Mark Scheme

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IGCSE BIOLOGY 4325, NOVEMBER 2006 MARK SCHEME

Key

- ; indicates separate mark points
- / indicates alternatives
- eq allow for correct equivalent
- word underlined means no alternatives allowed

Paper 1F

1. (a) D;
(b) C;
(c) D;
(d) B;
(e) C;
(f) A;
(g) D;
(h) C;
(i) A;
(j) B; (10)

Total 10 marks

2. (a) high milk yield;
quality of milk;
high meat production / fast growth / large;
lean meat; max
non-aggressive; (2)
- (b) (humans) choose animals to breed / use the best; (1)

Total 3 marks

3. carbon dioxide;
greenhouse;
sewage;
oxygen; (4)

Total 4 marks

4. (a) transport blood / pump blood round the body; (1)
- (b) (i) A - left ventricle;
B - tricuspid / AV valve / valve; (2)
- (ii) arrow into the right atrium;
arrow out of right ventricle through pulmonary artery; (2)
- (iii) close;
stop backflow of blood; (2)
- (iv) more oxygen / oxygenated / brighter red;
less carbon dioxide; (2)
greater pressure; max (2)

Total 9 marks

5. (a) (i) water; (1)
(ii) light / sun; (1)
- (b) (i) ✓ x/✓;
x ✓;
✓ x;
x ✓; (4)
- (ii) magnesium; making chlorophyll;
OR nitrate; making amino acids / protein;
OR potassium; enzyme action;
OR calcium; cell walls;
OR phosphate; ATP; (2)

Total 8 marks

6. (a) reproductive system; (1)
- (b) (i) B - ureter;
C - urethra;
D - bladder; (3)
- (ii) water;
urea; max (2)
salts;
- (c) skin;
lungs; (2)

Total 8 marks

7. (a) idea of amount / quantity; (1)
- (b) (i) contains nitrogen / nitrates / minerals / salts / ions;
for crop growth; (2)
- (ii) does less damage to environment / less pollution /
improve soil texture; (1)
- (c) (i) A; (1)
- (ii) both increase yield;
herbicide more than pesticide;
fewer pests to eat crop; max
fewer weeds to compete for water / eq; (2)
- (iii) same weather / temperature / climate / rainfall / eq; (1)

Total 8 marks

8. (a) A - virus;
B - bacterium;
C- fungus; (3)
- (b) A / virus; (1)
- (c) (i) A / virus;
(ii) B / bacterium;
(iii) C / fungus;
(iv) C / fungus; (4)

Total 8 marks

9. stem: negative / grow up / against gravity;
geotropism; (ONCE)
light;
photosynthesis;
glucose / starch / energy;
respiration;
- root: positive / grow down / with gravity;
geotropism;
water;
support / anchor / eq;
minerals / ions / named mineral/ion; max
chlorophyll manufacture; (5)

Total 5 marks

10. (a) pancreas;
small intestine / ileum; (2)
- (b) lipase works best with bile;
(lipase works) least well in acidic solution /
better in alkaline conditions;
bile is alkaline / neutralises / optimum pH / eq ;
bile emulsifies fat;
larger surface area; max
denature / affect active site; (4)
- (c) starch;
glucose; (2)

Total 8 marks

11. (a) two; (1)
- (b) N n N n;
Nn Nn NN nn;
no no no yes; (3)
- (c) (i) nucleus / chromosome;
(ii) DNA; (2)

Total 6 marks

12. (a) correct chain;
chain in the correct direction (arrows); (2)
- (b) voles increase;
fewer weasels eating them / less eaten fewer predators / eq;
owls increase;
more voles / more small birds / more food / less
competition; (4)
- (c) (i) voles, small birds or beetles; (1)
(ii) producers; (1)
(iii) producers are few / trees are few / one tree;
producers are heavy / trees are heavy / have lots of
mass / bigger / larger; (2)

Total 10 marks

13. (a) transpiration / evaporation; (1)
- (b) A;
lost 0.02 g and compared with B or C; (2)
- (c) number of stomata;
stomata size / opening;
waxy cuticle;
hairs on surface;
surface area /size / wider / eq;
thickness;
wind;
light intensity;
humidity; (max
temperature; IGNORE environment /climate (3)

Total 6 marks

14. (a) cut / eq;
sterilise / disinfect;
nutrient / agar / food / medium / growth substance /
glucose / minerals;
roots / leaves; IGNORE water (4)
- (b) genetically / alleles / genes / DNA;
identical / same; (2)
- (c) quicker;
all plants produce drug / less variation idea / identical; (max
lots made / commercial idea; (1)

Total 7 marks

PAPER TOTAL 100 MARKS

Paper 2H

1. (a) A - virus;
B - bacterium;
C- fungus; (3)
- (b) A / virus; (1)
- (c) (i) A / virus;
(ii) B / bacterium;
(iii) C / fungus;
(iv) C / fungus; (4)

Total 8 marks

2. stem: negative / grow up / against gravity;
geotropism; (ONCE)
light;
photosynthesis;
glucose / starch / energy;
respiration;
- root: positive / grow down / with gravity;
geotropism;
water;
support / anchor / eq;
minerals / ions / named mineral/ion;
chlorophyll manufacture; max
(5)

Total 5 marks

3. (a) pancreas;
small intestine / ileum; (2)
- (b) lipase works best with bile;
(lipase works) least well in acidic solution /
better in alkaline conditions;
bile is alkaline / neutralises / optimum pH / eq ;
bile emulsifies fat;
larger surface area; max
denature / affect active site; (4)
- (c) starch;
glucose; (2)

Total 8 marks

4. (a) two; (1)
- (b) N n N n;
Nn Nn NN nn;
no no no yes; (3)
- (c) (i) nucleus / chromosome;
(ii) DNA; (2)

Total 6 marks

5. (a) correct chain;
chain in the correct direction (arrows); (2)
- (b) voles increase;
fewer weasels eating them / less eaten fewer predators / eq;
owls increase;
more voles / more small birds / more food / less competition; (4)
- (c) (i) voles, small birds or beetles; (1)
(ii) producers; (1)
(iii) producers are few / trees are few / one tree;
producers are heavy / trees are heavy / have lots of
mass / bigger / larger; (2)

Total 10 marks

6. (a) transpiration / evaporation; (1)
- (b) A;
lost 0.02 g and compared with B or C; (2)
- (c) number of stomata;
stomata size / opening;
waxy cuticle;
hairs on surface;
surface area /size / wider / eq;
thickness;
wind;
light intensity;
humidity; max
temperature; IGNORE environment /climate (3)

Total 6 marks

7. (a) cut / eq;
sterilise / disinfect;
nutrient / agar / food / medium / growth substance / glucose
/ minerals;
roots / leaves; IGNORE water (4)
- (b) genetically / alleles / genes / DNA;
identical / same; (2)
- (c) quicker;
all plants produce drug / less variation idea / identical; max
lots made / commercial idea; (1)

Total 7 marks

8. (a) C; (1)
- (b) water into chip;
osmosis;
selectively permeable membrane; max
high concentration to low concentration; (3)

Total 4 marks

9. (a) (i) biuret;
purple / mauve / lilac; (2)
- (ii) digested / broken down;
peptides / polypeptides / amino acids;
enzyme / protease / pepsin;
HCl; max
optimum / best / most suitable pH; (3)
- (b) (i) increases + decreases;
peaks at 32 / correct reference to numbers; (2)
- (ii) 2 700; (1)
- (c) less predation;
less heat loss / less energy loss;
less movement idea;
control of food quantity / quality / conditions;
more energy for growth; max
less likely to contract disease; (2)

Total 10 marks

10. (a) (i) correct heights at rest + exercise;;
axes correct and labelled;
key to distinguish rest and exercise; (4)
- (ii) 84 000; (1)
- (iii) 300;; 500 - 2000 or 1500 / divided by 500; (2)
- (b) (i) arterioles / (small) arteries;
widen / dilate / expand / vasodilation; max
muscles relax; (2)
- (ii) heat loss;
radiation / convection;
lower body temperature / keep at 37°C / optimum / max
cools down; (2)
- (iii) glucose / oxygen;
respiration;
energy / ATP;
muscle contraction / shortening;
removes CO₂ / lactic acid; max
less anaerobic respiration; (2)

Total 13 marks

11. (a) (i) 11 300; (1)
- (ii) 5 100; (1)
- (b) (i) coronary artery; (1)
- (ii) less oxygen / glucose;
less aerobic respiration / anaerobic respiration;
less energy / ATP;
lactic acid;
toxic / eq; max
heart attack / no muscle contraction / eq; (3)
- (c) testosterone: develop male secondary sexual characteristics
/ eq;
progesterone: maintain uterus lining / inhibit FH/FSH;
myelin: speed nerve impulses; (3)

Total 9 marks

12. (a) increase yield / grow more / grow faster;
increase photosynthesis;
enzymes; (3)
- (b) start at one week;
line going down and to the left of *Encarsia* line;
line going very low (below 10); max
line then going back up; (2)
- (c) no resistance; IGNORE immune
no collateral damage to other species / food chains /
specific;
keeps pests low;
no reintroduction / reapplication needed / long lasting; max
less pollution / no harm to environment; (3)

Total 8 marks

13. (a) E or C;
B or D; (2)
- (b) (human) gene / DNA (for insulin);
plasmid / vector;
restriction enzyme;
same restriction enzyme;
cuts / eq;
ligase; max
sticks / eq; (5)
- (c) (i) pancreas / Islets of Langerhans; (1)
(ii) controls/regulates sugar/glucose levels;
reduces glucose;
converts to glycogen; max
in liver; (3)

Total 11 marks

14. (a) (i) pituitary; (1)
(ii) blood / eq; (1)
(iii) collecting duct; (1)
- (b) (i) no / less reabsorption less water into blood / blood
more concentrated; (2)
dehydration / loses too much water;
(ii) drink (lots of) water; (1)
ACCEPT ADH tablets / injection

Total 6 marks

15. (a) bottom: plants make cyanide;
snails leave plants / do not eat plants;
plants survive;
(advantage to have) gene / allele for cyanide/
enzyme;
reproduce; (ONCE)
pass on ability / gene / allele to make cyanide;
(ONCE)
- top: plants do not make cyanide;
no snails;
cold;
cyanide would kill plants;
(disadvantage to have) allele gene / allele for
cyanide/enzyme;
ice bursts bags / enzymes would be released;
reproduce; max
pass on ability / gene / allele not to make cyanide; (5)
- (b) nitrifying;
denitrifying;
nitrogen fixing;
decomposing / decomposers; (4)

Total 9 marks

PAPER TOTAL 120 MARKS

Paper 3

1.

Food type	Test solution	Colour of positive result	
<i>glucose</i>	Benedicts;	red;	
<i>lipid</i>	water and ethanol;	cloudy white;	(4)

Total 4 marks

2.

- (i) D;
 - (ii) A;
 - (iii) B;
 - (iv) C;
- All 4 or 3 = (3); 2 correct = (2); 1 correct = (1) (3)

Total 3 marks

3. (a) larvae prefer dark conditions / more on dark side;
ACCEPT converse (1)

(b) (i)

Experiment	Number of larvae in light	Number of larvae in dark
1	3	7
2	2	8
3	4	6
Total	9	21

light and dark columns;
experiment column;
numbers match; max
total/average column; (3)

- (ii) more larvae found in dark / prefer dark; (1)

- (c) repeat in dark / light;
equal temperature / humidity / eq; max
IGNORE repeat alone / leave for longer (1)

Total 6 marks

4. (a) (i) 71; (1)
(ii) 94.67 / 94.66 / 94.6 / 94.7;;
answer in (i) divided by 75 for one max (2)
- (b) to calculate average / so results are more reliable; (1)
IGNORE accurate / precise / fair test
- (c) fewer seeds germinate; (1)
- (d) light;
keep all seeds in dark / cupboard / same room / eq;
or
temperature; max
keep all seeds in incubator / water bath / near lamp; (2)

Total 7 marks

5. (a) 6.67 plants per m² / accept 6.6 to 6.7;; (2)
20 for one max
- (b) 17; (2)
11;
- (c) size (at least half of each axis);
label (species and A and B);
axis (number of plants and numbers);
plot;; (5)
- (d) more plants in A;
more plantain in trampled area / A;
less groundsel in trampled area / A;
dandelion the same;
daisies the same;
plantain can tolerate trampling;
groundsel cannot tolerate trampling;
dandelion unaffected by trampling; max
daisies unaffected by trampling; (2)

Total 11 marks

6. (a) increasing temperature increases KE of molecules / more collisions / increases enzyme activity; (1)
- (b) 14; (1)
- (c) (i) as temperature increases;
the number of bubbles / photosynthesis / rate increases / 30°C is best temperature for photosynthesis; (2)
- (ii) yes / no qualified;
only up to 30°C / decrease at highest temperature / at 35°C; (2)
- (d) result 1 for 20°C / any result at 35°C; (1)
- (e) (i) temperature (constant/controlled);
electronic / thermostatically controlled water bath / digital thermometer / eq;
or
bubbles / volume / amount of gas; (2) **max**
- (ii) increase above 35°C / decrease below 15°C / smaller increments;
to see if the rate of photosynthesis alters;
or
use other species;
compare pattern; (2)
- (f) (i) carbon dioxide / light; (1)
- (ii) add stated volume of sodium hydrogencarbonate to the pond water / same distance / intensity / wattage;
IGNORE same place/amount (1)

Total 13 marks

7. C - two or more stated concentrations of amylase / enzyme;
O - same source of enzyme / human / fungus;
R - repeat tests for each concentration;
M1 - ref to time;
2 - iodine solution / Benedict's;
3 - black to yellow / blue to red / idea of colour change;
S1 - same / stated concentration/volume of starch;
2 - same temperature / water bath; (2) **max**
- 3 - equal volume of amylase / enzyme; (6)

Total 6 marks

PAPER TOTAL 50 MARKS

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