

IGCSE DA Biology 4437 4H Mark Scheme (Results) Summer 2007

IGCSE

IGCSE DA Biology 4H

DA SCIENCE (BIOLOGY) 4437, MAY 2007, MARK SCHEME

Key

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

Paper 4H

1. (a) B;
D;
C; (3)
- (b) muscles;
contract;
peristalsis; max
(2)
- (c) (i) cellulose; (1)
(ii) skin / gums / prevent scurvy / help connective tissue /
protect against infection / help immune system; (1)
Ignore keep healthy
- (d) (i) the faster the exercise the more energy needed /eq; (1)
(ii) 5 250; (1)

Total 9 marks

2. (a) (i) gas used = oxygen (1)
gas produced = carbon dioxide;
(ii) yeast in middle; (2)
arrows correct;
- (b) (i) 38; (1)
(ii) 50;;
38 - 57 / 19 / 57 - 38 for 1 mark (2)
- (c) optimum / best / ideal / better temperature / warmer / high;
enzymes / respiration / metabolism / reactions / eq; max
yeast reproduced; (2)
more food;
- (d) (i) XX and XY;
female and male;
gametes X and Y and all X / X and X;
offspring XX and XY; Allow ecf from wrong parents
50:50 ratio given / eq; max
due to chance / random fertilisation / (5)
(ii) fewer Y sperm / more X sperm / wrongly sexed /
miscounted / eq;
Ignore gene (1)
Ignore temperature

Total 14 marks

3. (a) reduce yield / eat crop / eat leaf;
less leaf / less surface area / trap light / absorb carbon dioxide;
less photosynthesis; (3)
- (b) kill/destroy pests / insects;
increase yield / reduce crop loss / prevent eating crop / eq; (2)
- (c) (i) 28; (1)
(ii) 48 / 48 thousand / 48 000; (1)
- (d) kills other insects / not specific;
affect consumer / disrupts food chains / persistent / accumulation
/ not broken down / eq; max
reapplication needed / short lasting; (2)
resistant; Ignore immune
effect on humans / eq;
Ignore expensive
Ignore eutrophication

Total 9 marks

4. (a) (i) urea / water / salt / urine / mineral ion /
named mineral ion; (1)
(ii) (less) oxygen transport; (1)
- (b) (i) white blood cells / lymphocytes / white / B / B cells / wbc; (1)
(ii) diaphragm / intercostal muscles;
no contraction;
no volume/pressure changes (in lung/chest);
no air/gas/oxygen in / no air/gas/carbon dioxide out;
less oxygen to cells/blood/body;
less respiration / energy; max
Ignore suffocation / death (3)

Total 6 marks

5. (a) 15 : 1 / 300:20 / 150:10 / 75:5; (1)
- (b) (lots of) waste / organic material /eq;
microorganisms / bacteria / decomposers /eq;
respiration; max
using up oxygen; (3)
- (c) goes up / increase / rise / eq; (1)

Total 5 marks

6. tar;
 coughing;
 effect on cilia;
 mucus build up;
 bronchitis;
 bacteria / microorganisms / infection;
 cancer / carcinogen;
 blockage to tubes / difficulty in breathing/ventilation;
 emphysema;
 reduced surface area / less/damage to alveoli / less gas exchange /
 less diffusion; max
(5)

Total 5 marks

7. (a) 1 mark for each correct arrow;;; (4)
 (b) arrow from any box to carbon in atmosphere; (1)

Total 5 marks

8. (a) palisade; (1)
 (b) 420 to 460; Ignore blue
 650 to 690; Ignore orange (2)
 (c) less photosynthesis;
 reflects / does not absorb green light; (2)
 (d) temperature;
 CO₂; max
 light intensity; (2)

Total 7 marks

9. (a) (i) has atrium;
 has ventricle; max
 has valve; (2)
 blood in via vein;
 blood out via artery;
 Ignore chambers
 (ii) Atrium and ventricle similar size / atrium bigger;
 thicker walled ventricle;
 one valve;
 two chambers / one atrium / one ventricle / human has 4;
 no septum / not left or right / eq; max
 fewer vessels / eq; (2)
 (b) blood passes through heart once;
 heart to gas exchange organ to body / not to lung / to gill / ref to
 double circulation / two pumps / one atrium and one ventricle / (2)
 in humans blood to lungs and to body;

(c)

Substance	Origin	Destination
Oxygen	lungs;	respiring cells
Glucose	<u>small intestine</u> / ileum / villi;	respiring cells
Urea	liver	kidney / renal tubules / nephron;
ADH	pituitary;	kidney / renal tubules / nephron / collecting duct;

(3)

Total 12 marks

10. (a) (i) restriction / endonuclease; (1)
(ii) ligase; Restrict lipase (1)
- (b) (i) insulin / eq; (1)
(ii) can be made quickly / in large quantities/ exact substance; (1)
Restrict cheap

Total 4 marks

11. explants;
agar / nutrient / growth;
nutrients / minerals / growth regulators / glucose / H₂O / vitamins;
nutrients / minerals / growth regulators / glucose / H₂O / vitamins;
compost / soil / eq;
temperature / carbon dioxide / light / humidity / water;
temperature / carbon dioxide / light / humidity / water;
clones;
identical;

Total 9 marks

12. change/damage/mistake to genetic material / eq;
passed on / inherited;
rare / random / eq;
alters characteristic / named example eg sickle cell/Down's
harmful / description of effect;
few beneficial / description of effect; max
increase/decrease of gene/allele/condition/numbers in population; (5)
natural selection / evolution / speciation / eq;

Total 5 marks

PAPER TOTAL 90 MARKS