



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCE

Biology B

Unit BYB8/A

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Section A

Question 1

- (a) larger/greater body mass;
requiring more energy for movement / more cells therefore increased metabolic rate/respiration; 2
(reject more active, growth rate)
(no mark for higher metabolic rate without qualification)
- (b) (i) at 17 still growing/at 25 growth complete 1
(ii) (age 25 –70) protein still required for tissue replacement / named example; 1
(accept enzymes / hormones)
- Total 4
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Question 2

- (a) (i) better nutrition / better knowledge of spread of disease /
reduction in infectious diseases / application of medical advances /
clean water / improved living conditions (specific e.g. sanitation) /
use of smallpox vaccine; 1
(ignore general reference to vaccines/antibiotics)
(reject health care) (allow specific reference to smallpox)
- (ii) lack of contraception / large families needed to help family provide
sufficient food/earn income / pressure to have many children due to
high infant mortality rate / cultural/religious idea of extended family; 1
- (b) link between changes in birth and death rates and population change;
decrease in both birth and death rates leading to rise in population description
of population rising then levelling off; 2
- Total 4
-

Question 3

- (a) tumour cells carried in bloodstream/lymphatic system / by growth into other organs; 1
- (b) (i) $\frac{4013 + 2157}{30775} \times 100 = 20\%$
- principle of correct calculation/correct equation but incorrect calculation = 1 mark*
correct answer = 2 marks
- (ii) men smoke(d) more/ explained/example of work-related reason; 1
- (c) mutation in DNA/ of skin cells/ specific example; (*allow damage to DNA*) caused by UV light/ UV light is mutagenic/carcinogenic; uncontrolled cell division; (*reject faster*) switches on/makes cancer-causing gene/oncogenes/ switches off cell division suppressor genes; 3 max
- Total 7
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Question 4

- (a) (i) operant (conditioning); 1
- (ii) (gradual) decrease in time to escape; not a reasoned response / idea of trial and error/ chance/ accidental/ natural action; 2
- (b) the reward of (the food); makes a particular action/behaviour occur more rapidly/likely. (*reject often/frequently*) 2
- Total 5
-

Question 5

- (a) signal/shape/colour/action that leads to a specific response/behaviour/action;
plus appropriate example e.g.
swollen belly (female) leading to zig-zag dance (male)/
pointing of male/ nest causes female to follow/enter nest/
female in nest causes male to tremble/
eggs in nest causes male to enter/fertilise eggs; 2
- (b) male more likely to mate/attract mate/ drive away males;
produce more offspring;
greater chance of offspring surviving; 2 max
- (c) reduces competition for mates /increases chance of mating;
- OR
- behaviour is an innate /reflex action; 1
- (d) supply of oxygen;
increased respiration (so faster growth); 2
- (c) (ii) variation/some male sticklebacks fanned eggs others did not;
as a result of mutation;
eggs which are fanned more likely to survive to reproduce/
develop quicker/at an advantage;
more likely to pass on genes/alleles;
increase in number of relevant genes/gene frequency; 3 max
- Total 10
-

Question 6

- (a) large number of blood vessels/villi which increases surface area for exchange;
large maternal blood supply / regular flow of blood (*allow countercurrent idea*)
maintains diffusion gradient;
closeness of / short distance between maternal and fetal blood gives shorter
diffusion pathway; 2 max
- (b) (i) mother removes phenylalanine;
so it does not accumulate (to a harmful level);
OR
mother provides tyrosine;
so no shortage; 2
- (ii) recessive (*no mark*)
both parents heterozygous/carriers;
baby has condition but parents do not;
baby receives recessive allele from each parent/ is homozygous recessive.

(*allow annotated genetic diagram*) 3
- (iii) changes tertiary structure / 3D shape of enzyme;
alters active site;
enzyme unable to bind with substrate/phenylalanine/ form enzyme-
substrate complex; 3
- Total 10
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Question 7

- (a) (i) **C** 1
- (ii) FSH stimulates development of follicles / ovaries which release oestrogen;
(build up of) oestrogen inhibits FSH; 2
- (b) antibodies are specific to antigens;
shape of antibody complementary to/fits with shape of hCG;
clumping a result of this complex / combination/fitting of hCG and antibody;
antibody combines with two hCG molecules/has two binding sites. 3 max
- (c) (i) small molecule;
blood pressure/ultrafiltration forces hCG from blood capillaries; 2
- (ii) suitable suggestion with explanation e.g.
reabsorption requires carriers/proteins/is selective;
no carriers for hCG;
OR
hCG small enough to pass out of glomerulus;
but too large to be reabsorbed; 2
- Total 10
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