



General Certificate of Education

Biology 6416

Specification B

BYB8/A Behaviour and Populations

Mark Scheme

2007 examination - June series

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Question 1

- (a) 12.1 (%);; 2
 (4.2 or (38.9 – 34.7) for 1 mark)
- (b) Suitable factor with explanation
- For example:
 0-15,
 Falling birth rate/desire for smaller families/increased use of contraception;
- 16-64,
 Lower mortality (rate)/better healthcare/named lifestyle factor/named socio-economic factor/immigration;
- Over 65,
 Lower mortality (rate)/better healthcare/named lifestyle factor/socio-economic factor; 3
 (factors must be different to gain full marks)

Total 5**Question 2**

- (a) Two suitable advantages;;
- For example:
 Attracting/obtaining a mate;
 Protect food (source);
 Protect young/mate/nests (from predators); 2 max
- (b) Two suitable ways;;
- For example:
 Species recognition (so fertile offspring produced);
 Identify/attract opposite sex/mate;
 Change behaviour/physiology, to bring mate(s) into breeding state;
 Change behaviour/physiology to prevent attack (by potential mate); 2 max
- (c) Mean number of offspring rises (up to 30 – 40 m), then falls;
- Low nests, waves could wash chicks/nest away;
 If nest is high/above 37-40m, adverse effect of wind/predators; 3

Total 7

Question 3

- (a) (i) Classical conditioning / conditioned reflex; 1
- (ii) Stimulus of sound of tin associated with being fed immediately afterwards;
After several repeats, the dog salivates just on hearing the tin being opened; 2
- (b) Evaporation of water/saliva;
From moist surfaces;
Takes heat from the blood;
Large surface area (of tongue and lungs);
(Panting) maintains water diffusion gradient; 3 max
- Total 6**

Question 4

- (a) Lumen/endothelium damaged;
Blood clots forms;
Blood flow disrupted to the heart muscle/ in the coronary artery/coronary artery gets blocked; 3
- (b) Damaged valve allows blood to flow back into ventricle;
Reduces pressure/rate of flow of blood to the lungs;
Lower diffusion gradient for gaseous exchange;
Less oxygen to muscles; 3 max
- Total 6**

Question 5

- (a) (i) Receptor/IGF-1 has specific shape/tertiary structure;
IGF-1 has complementary shape to receptor (binding site); 2
- (ii) Adding phosphate changes tertiary structure/shape of enzyme;
Changes shape of active site;
So able to bind to substrate/formation of enzyme-substrate complex; 2 max
(Accept *makes more reactive*)
(Accept *lowering activation energy*)
- (b) (i) Reduced growth/lower birth mass;
Lower concentration of IGF -1;
Reduction in enzyme activity related to growth; 3

- (ii) Suitable explanation;
- For example:
 Passive smoking;
 Natural source of nicotine in diet;
 Nicotine patches;
- 1 max

Total 8

Question 6

- (a) (i) Progesterone, as it rises after ovulation/prepares for implantation/
 falls at the end of the cycle; 1
- (ii) LH, as it shows a (sharp) peak; 1
- (b) Between days 2 and 3/4;
 Just after ovulation;
- OR*
- Between days 0 and 1/2 or between days 20 and 21/22;
 When ripe eggs in follicles/at ovulation; 2
- (c) Rise in /high concentration of chorionic gonadotrophin (CG);
 Rise in progesterone/high concentration maintained; 2
- (d) Fetal haemoglobin has a higher saturation of oxygen;
 Fetal haemoglobin has greater affinity for oxygen;
 At any given /lower partial pressure or concentration of oxygen;
 Maintains/large diffusion gradient (for oxygen);
 Oxygen across the placenta/from mother to fetus; 4 max

Total 10

Question 7

- (a) Immune system weaker/less efficient;
 Fewer memory cells;
 Fewer lymphocytes;
 Fewer antibodies;
- OR*
- Living in residential homes;
 With greater risk of cross infection; 2 max

- (b) Vaccine contains antigen;
Antibody/lymphocytes against antigen;
Reference to memory cells;
If influenza virus gets into the body, it is destroyed by antibody (before symptoms arise); 2 max
- (c) Mutation;
Changes base sequence in RNA/nucleic acid/DNA;
Changes codon(s) on mRNA;
Different amino acids/amino acid sequence;
Changes tertiary structure/3D shape of antigen/protein; 4 max

Total 8