



## **General Certificate of Education**

# **Biology 6416**

## *Specification B*

**BYB8/A    Behaviour and Populations**

# **Mark Scheme**

*2008 examination - June series*

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**Question 1**

- (a) (i) Damage to endothelium / lining of artery;  
Cholesterol / LDLs / fats;  
Enter artery wall / build up on artery wall;  
Occurs if body has higher LDL:HDL ratio;  
Plaque becomes fibrous / calcified; 2 max
- (ii) Less metabolism of fats / fats not broken down;  
Increases LDL / decreases HDL; 1 max
- (iii) High cholesterol / high (saturated) fat in diet / obesity;  
High salt in diet;  
High blood pressure;  
Genetic factors;  
Smoking;  
Diabetes;  
Age / menopause in women;  
(Accept scar tissue in endothelium) 2 max
- (b) (Atheroma / blood clot) blocks artery;  
Insufficient oxygen / blood to heart muscle; 2

**Total 7**

**Question 2**

(a)

	Combined pill
Frequency of use	Every day / 21 out of 28 days;
Effect on FSH secretion	Decreases / inhibits;
Effect on ovulation	Stops ( <u>Not decreases</u> );

;3

- (b) Embryo less likely to implant;  
Rate of development of uterine endometrium decreases / Endometrium too thin  
or not vascular / embryo development and endometrium development do not  
correspond; 2
- (c) (Splitting results in) genetically identical offspring or clones / conventional leads  
to variation;  
Reason – e.g. reference to role of mitosis/meiosis or formed from one zygote; 2

**Total 7**

**Question 3**

- (a) Bacteria airborne / bacteria present in small water droplets (in air); 1
- (b) Description (1 mark)  
 Decreased percentage vaccination leads to increased cases of whooping cough;  
+ Explanation (2 marks)  
 Fewer children immune / decreased ability to produce memory cells;  
 Lower antibody production;  
 Bacteria not destroyed, so disease develops;  
 More likely / higher probability of coming into contact with infected person; 3 max
- (c) Herd immunity;  
 90 - 95% of population vaccinated;  
 Lower chance of (unvaccinated babies / babies under 3 months) coming in contact with bacteria / infected people;
- OR**
- 0 cases of whooping cough (in 2000) / 30,000 cases of whooping cough (in 1980);  
 No source of infection / greater chance of infection; 2 max

**Total 6****Question 4**

- (a) (i) Habituation; 1
- (ii) Less energy wasted / greater ability to respond to new stimuli / does not respond to harmless stimuli; 1
- (b) Transmitter produces impulse / action potential (in motor neurone) or binding of transmitter (to post-synaptic membrane) causes change in charge (across membrane) / depolarisation;  
 Lower amount of transmitter stops threshold for nerve impulse or action potential being reached / EPSP not at threshold;  
 No impulse / action potential produced in motor neurone;  
 No transmitter released at neuromuscular junction;  
 So no contraction of (gill) muscle; 3 max

**Total 5**

**Question 5**

- (a) (i) Higher proportion of (more) muscle / lower proportion of (less) fat; 1
- (ii) (Tall people have) larger surface area to volume ratio;  
So greater heat loss;  
High BMR to maintain body temperature; 2 max
- (iii) Thyroxine / growth hormone; 1
- (b) Decreased / less oxygen uptake (into blood / body);  
Thicker walls increased diffusion path / reduced diffusion gradient;  
(Decreased elasticity causes) less air in lungs renewed / smaller ventilation, so  
reducing diffusion gradient;  
(In muscles) reduces ability to contract / move / reduces (aerobic) respiration; 3 max

**Total 7****Question 6**

- (a) Limited amount of food can be collected (in unit time) / animal can only  
consume so much food (per unit time);  
More time defending territory;  
Less time foraging; 2 max
- (b) Increased muscular activity / named activity;  
Increased respiration; 2
- (c) (i) When energy loss = energy gain; 1
- (ii) Maximum difference between energy gain and loss; 1
- (d) Uninterrupted courtship / mating / raising of young or more successful breeding;  
Predation / disease less likely; 2

**Total 8**

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**Question 7**

- (a) (Receptor) proteins different / specific shape;  
Due to tertiary structure;  
Complementary nature of two proteins;  
Different proteins present in different species; 2 max
- (b) (i) Acrosome / acrosome reaction;  
Releases enzymes / named enzyme (hyaluronidase);  
Digests outer layer of egg / zona pellucida;  
Fusion of egg and sperm membranes; 3 max
- (ii) Formation of fertilisation membrane / cortical reaction (or described) /  
destruction of ZP3 receptors; 1
- (c) ATP formed directly from Krebs cycle;  
Production of reduced NAD / FAD or hydrogen attached to NAD / FAD;  
 $H^+$  or electrons passed through series of coenzymes / carriers / redox reactions /  
electron transport chain;  
Energy released in transfer / energy made available;  
Used to combine ADP and phosphate (to form ATP); 4 max  
*(Allow  $H^+$  moved across inner mitochondrial membrane and pass through  
stalked particles forming ATP)*

**Total 10**