



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCE

# Biology / Human Biology A

## Unit BYA9/W

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**Question 1**

- (a) (i) Metabolism/respiration;  
High rate associated with rapid growth;  
Low temperature gradient between fetal and maternal blood;  
Limited heat loss/reason for limited heat loss; max 3
- (ii) Larger SA/V ratio/smaller V/SA ratio;  
Less fat for insulation/less subcutaneous fat;  
Less well developed temperature control (mechanism); max 2
- (b) (i) I-F; 1
- (ii) I-F-U / I-(F+U) 1
- (c) (i) Proteins/amino acids contain nitrogen/N;  
In amino groups/in -NH<sub>2</sub> groups; [*Ignore: references to amine*]  
Amount of nitrogen proportional to protein; max 2
- (ii) Enzymes;  
Mucus;  
Cells from lining of gut;  
Microorganisms/bacteria; max 2
- (iii) Plant cells are surrounded by cell walls;  
Cellulose (cell walls) not digested/cellulase not produced;  
Some proteins not released from cells;  
More nitrogen in faeces; max 3  
[*Accept: converse argument for protein from animal source*]
- (d) (i) Boys entering/at peak of puberty;  
Protein required for new muscle/bone/growth (spurt); 2
- (ii) Red blood cells replaced every four months/short life span/every few months;  
Production of haemoglobin;  
Production of enzymes/membranes; max 2  
[*Note: answers must specify this level of detail. We should not be crediting 'healthy blood' level of response*]
- (iii) Credit method showing calculation of protein requirement per kg body mass;  
For 50+ age groups; 2

Total 20 marks

**Question 2**

- (a) Many different kinds of antibiotic/types of microorganism/reactions/ processes; 1
- (b) (Ring of) atoms/part of molecule found in all (penicillins)/central part of molecule; [*Reject: answers relating to function*] 1
- (c) (i) Water potential inside cell lower/more negative than outside;  
Water enters by osmosis;  
Cell wall weakened/thin;  
Cannot withstand pressure inside cell/pressure increases in cell; max 2
- (ii) Cell walls are made of cellulose (so will not be affected)/not made of peptidoglycan; 1
- (d) (i) DNA in bacteria and host;  
Substance will also damage host DNA;  
[*Note: "Incapable of distinguishing between DNA in different types of cell" = 1 mark*] 2
- (ii) DNA replication involves joining nucleotides;  
In chains/lines;  
OR (Inhibitory) effect on active site specified;  
Nucleotides cannot bind; 2
- (e) (i) All bacteria/microorganisms produce proteins;  
Involving formation of peptide bonds/by joining amino acids; 2
- (ii) Affects only small ribosomes/does not affect large ribosomes; 1
- (f) (i) Active transport as it produces higher concentration inside cell; 1
- (ii) Mammalian cells do not have relevant protein/carrier; 1

Total 15 marks