



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

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 $-NH_2$ 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; [<i>Reject: answers relating to function</i>] | | 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;
[<i>Note: "Incapable of distinguishing between DNA in different types of cell" = 1 mark</i>] | | 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