



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCE

Biology / Human Biology A

Unit BYA8/W

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Question 1

- (a) Metabolism/respiration produces heat;
Small surface area to volume ratio;
Environmental/air temperature high;
Heat gained/lost by radiation;
Fat limits heat loss; max 3
[Note: small surface area to volume ratio=large volume to surface area ratio]
- (b) Skin heated by exposure to sun;
Core insulated by fat;
Which is subcutaneous/under skin;
Cooling effect of water; max 2
- (c) (i) I-F; 1
(ii) I-F-U / I-(F+U); 1
- (d) (i) Proteins/amino acids contain nitrogen;
In amino/NH₂ groups;
Amount of nitrogen proportional to amount of protein; max 2
- (ii) Mucus;
Enzymes;
Cells from lining of gut;
Microorganisms/bacteria; max 2
- (iii) Plant cells are surrounded by cell walls;
Cellulose/cell walls not digested/broken down;
Cellulase/cellulose digesting enzymes produced by bacteria;
Proteins released from cells;
More nitrogen in faeces of humans/less in ruminants;
[Accept: converse argument in non-ruminant] max 3

- (e) (i) Detection of/recognition/stimulation by antigen;
B-cells/B-lymphocytes;
Produce clone/divide/produce plasma cells;
[Note: reference to antigens must be in context of triggering process]
[Ignore: references to T-cells] max 2
- (ii) Rinderpest only affects older animals;
Older animals exposed to past epidemic;
Kills young animals but not older ones;
Virus has long dormancy period; max 2
- (iii) Infected hippos;
Spread virus/disease to cattle;
Which reduces profitability;
[Ignore: references to methods of transmission] max 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;
Cannot withstand pressure inside cell/pressure increases in cell; max 3
- (ii) Cell walls are made of cellulose not made of peptidoglycan; 1
- (d) (i) DNA in bacteria and host/human;
Substance will also damage host/human DNA;
[Note: "Incapable of distinguishing between DNA in different types
of cell" = 1 mark] 2
- (ii) DNA replication involves joining nucleotides;
In chains;
OR Specific effect on active site of enzyme;
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

General Principles for marking the Essay:

Four skill areas will be marked: scientific content, breadth of knowledge, relevance and quality of language. The following descriptors will form a basis for marking.

Scientific Content (maximum 16 marks)

Category	Mark	Descriptor
Good	16	Most of the material reflects a comprehensive understanding of the principles involved and a knowledge of factual detail fully in keeping with a programme of A-level study. Some material, however, may be a little superficial. Material is accurate and free from fundamental errors but there may be minor errors which detract from the overall accuracy.
	14	
	12	
Average	10	Some of the content is of an appropriate depth, reflecting the depth of treatment expected from a programme of A-level study. Generally accurate with few, if any, fundamental errors. Shows a sound understanding of the key principles involved.
	8	
	6	
Poor	4	Material presented is largely superficial and fails to reflect the depth of treatment expected from a programme of A-level study. If greater depth of knowledge is demonstrated, then there are many fundamental errors.
	2	
	0	

Breadth of Knowledge (maximum 3 marks)

Mark	Descriptor
3	A balanced account making reference to most areas that might realistically be covered on an A-level course of study.
2	A number of aspects covered but a lack of balance. Some topics essential to an understanding at this level not covered.
1	Unbalanced account with all or almost all material based on a single aspect.
0	Material entirely irrelevant or too limited in quantity to judge.

Relevance (maximum 3 marks)

Mark	Descriptor
3	All material presented is clearly relevant to the title. Allowance should be made for judicious use of introductory material.
2	Material generally selected in support of title but some of the main content of the essay is of only marginal relevance.
1	Some attempt made to relate material to the title but considerable amounts largely irrelevant.
0	Material entirely irrelevant or too limited in quantity to judge.

Quality of language (maximum 3 marks)

Mark	Descriptor
3	Material is logically presented in clear, scientific English. Technical terminology has been used effectively and accurately throughout.
2	Account is logical and generally presented in clear, scientific English. Technical terminology has been used effectively and is usually accurate.
1	The essay is generally poorly constructed and often fails to use an appropriate scientific style and terminology to express ideas.
0	Material entirely irrelevant or too limited in quantity to judge.

Total 25 marks
