



General Certificate of Education

Human Biology 6413

Specification A

BYA9/W Written Synoptic Paper

Mark Scheme

2008 examination - June series

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Question 1

- (a) (i) Would not compete;
With weeds;
Temperature affects growth of different plants in different ways/
May affect growth of weeds differently to growth of crop plants; 2 max
- (ii) Carbon dioxide cannot enter/is a limiting factor;
Required for photosynthesis; 2
- (b) (i) 16.5(cm²) 1
- (ii) Longer and narrower/thinner; 1
- (iii) *Do not give credit for references to yes or no.*
At higher temperatures/30⁰C decrease in surface area/wilting/stomatal closure would lower rate of photosynthesis;
Less light falls on leaf/fewer chloroplasts/less chlorophyll;
Less carbon dioxide (enters leaf);
Temperature increases rate of reaction of photosynthetic enzymes;
Don't know to what extent this effect is offset by loss due to reduced surface area; 3 max
- (c) (i) As temperature increases, so do (mean) breathing rate and (mean core) body temperature/positive correlation with breathing rate and body temperature; 1
- (ii) Breathing results in water evaporating/loss of water vapour (from gas exchange system);
Heat required to evaporate water/change to water vapour;
Heat drawn from blood/body (lowering core temperature); 3
- (d) (i) No difference in the breathing rate of the cattle at the two temperatures/
Breathing rate will not be affected by temperature; 1
- (ii) Results close together so may be due to chance;
Statistical test determines probability of them being due to chance;
Null hypothesis being accepted/rejected; 2 max
- (e) (i) Able to spend more time in cool conditions feeding;
Spend less time resting/in shade;
Hot conditions lead to greater water loss;
Food/water linked to milk production; 2 max
- (ii) Inherit genes;
For high milk yield from European cattle;
Associated with temperature control from Sahiwal/local cattle; 2 max
- Total 20

Question 2

- (a) (Oxygen) obtained by diffusion;
Large surface area to volume ratio;
Short distance to inside cells/all cells; 3
Note that third marking point must clearly relate to cells inside the worm
- (b) It would diffuse into gut;
From capillaries/blood/tissue fluid in intestine wall; 2
- (c) Causes displacement of dissociation curve to the right/Bohr shift;
Therefore haemoglobin less saturated with oxygen/have lower affinity for oxygen;
(Host) haemoglobin releases more oxygen; 3
- (d) (i) Changes shape/charge/denatures;
Of carriers/membrane proteins/transport proteins/channel proteins; 2
- (ii) More glucose available for uptake by the parasite; 1
- (e) (Reaction between) acid from stomach/in stomach contents;
(and) hydrogencarbonate in pancreatic juice/from pancreas; 2
- (f) Produces NAD;
Acting as hydrogen acceptor / reduced (in glycolysis); 2
- Total 15

Question 3**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
	16	
Good	14	Most of the material of a high standard reflecting 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.
	12	
	10	
Average	8	A significant amount 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 most of the principles involved.
	6	
	4	
Poor	2	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.
	0	

Breadth of Knowledge (maximum 3 marks)

Mark	Descriptor
3	A balanced account making reference to most if not all 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.

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

The following symbols should be used in marking

- ✓ A valid point reflecting the level of knowledge expected of an A-level candidate
- x Incorrect biology
- Q Quality of written communication poor
- Material irrelevant

Additional notes on marking Question 3

Care must be taken in using these notes. It is important to appreciate that the only criteria to be used in awarding marks to a particular essay are those corresponding to the appropriate descriptors. Candidates may gain credit for any information providing that is biologically accurate, relevant and of a depth in keeping with an A-level course of study. Material used in the essay does not have to be taken from the specification, although it is likely that it will be. These notes must therefore be seen merely as guidelines providing an indication of areas of the specification from which suitable factual material might be drawn.

In determining the mark awarded for breadth, content should ideally be drawn from each of the areas specified if maximum credit is to be awarded. Where the content is drawn from two areas, two marks should be awarded and, where it is taken only from a single area, one mark should be awarded. However, this should only serve as a guide. This list is not exhaustive and examiners should be prepared to offer credit for the incorporation of relevant material from other areas of study.

Essay A Humans and microorganisms.**Section of
specification**

14.9 **Microorganisms as part of the environment**
Decomposition and recycling maintain nutrient balance

12.1 **Pathogens**
Bacteria and viruses are examples of pathogenic organisms
12.2 Plasmodium and malaria

12.6 **Making use of microorganisms**
Gene technology may be used in combating disease

Essay B The biological importance of plants to humans.

**Section of
specification**

Ecological cycles

14.9 The role of plants in the nitrogen cycle

14.9 Photosynthesis and respiration in giving rise to short-term fluctuations and long-term global balance of oxygen and carbon dioxide;

Plants and food

16.4 Digestion and absorption

16.5 Diet and dietary requirements

Energy transfer

14.7 Transfer of energy through food chains and food webs

14.6 Biochemistry of photosynthesis
