Biology: Written examination 1

SPECIFIC INFORMATION

Section A

Correct responses to the multiple-choice section and percentage of students with the correct response:

		%			%
1.	**A**	87	13.	**C**	54
2.	**D**	69	14.	**D**	38
3.	**B**	85	15.	**A**	60
4.	**C**	53	16.	**B**	60
5.	**B**	50	17.	**C**	60
6.	**A**	24	18.	**D**	66
7.	**B**	37	19.	**C**	71
8.	**C**	91	20.	**A**	70
9.	**A**	82	21.	**D**	87
10.	**D**	82	22.	**A**	36
11.	**B**	50	23.	**B**	49
12.	**C**	58	24.	**C**	45

Section B

For each question, an outline answer (or answers) is provided. Each answer is broken into parts to give an indication of the allocation of marks shown on the paper. In some cases, the answer provided is not the only answer that could have been awarded marks. Comments on student performance on the question follow the answers for each question.

The mean marks quoted are the mean marks awarded for answers over all markings.

Question 1

1a–b (Average mark 1.47/Available marks 3)

ai. Structure A phospholipid

aii. Structure B protein

b. Function of the protein channel is to move molecules or ions across the cell membrane.

The most common incorrect response in part a. was to name the structure instead of the compound in the structure.

Question 2

2a–b (0.83/2)

a. Xylem

b. Water changing from liquid to vapour state absorbs heat from leaf, hence cools the leaf.
OR
Heat in leaf absorbed by water which turns to water vapour – this process cools leaf.

2c. (0.93/3)

i. Increased solute concentration in guard cells so water moves into cell by osmosis.
AND
Cells become more turgid.

ii. Stomatal pore increases in size.

Part a. was answered correctly by most students. In part b. many students could not adequately explain how transpiration cools leaves. It was not enough to state that evaporation of water cools leaves.

Question 3

3a. (0.65/1)
Kidney *or* bladder

3b. (0.68/1)
Via blood stream

3c. (0.56/1)
When compared with control frog over the same period, experimental frog shows significant increase in weight after injection of AVT.

3d. (0.35/1)
Increased water uptake through the skin

3e. (1.15/2)
Any two of the following:
Via urine *or* via breathing out *or* via faeces *or* evaporation of water from the skin

3f. (0.50/1)
Bury itself in soil *or* seek shade *or* reduce SA:V ratio through posture *or* huddle together.

Responses to part c. that did not make the comparison of control frogs to injected frogs were not awarded marks.

Descriptions in part f. had to be clearly of behavioural mechanisms. Some responses described a physiological mechanism.

Question 4

4a. (0.60/2)

Any two of the following:

- Can only reproduce inside a host cell
- Outer protein coat
- Contains DNA or RNA *or* can have RNA as genetic material.

4b. (0.47/1)

Carried from plant to plant by insect or other vector
or airborne by wind
or by an infected plant touching another
or by virus moving from infected plant into water in soil and moving into roots of another plant.

4c. (0.54/1)

Reduced photosynthesis *or* reduced growth and crop yield *or* plant grows at slower rate.

The most common incorrect response to part a. was that it contains DNA. Some of the answers given in part b. lacked sufficient detail, e.g. in air or contact.

Question 5

5a. (1.35/2)

Any two of:

- lays many eggs
- legs modified as hooks
- long, thin body.

5b. (0.28/1)

The answer given had to be clearly specified and related to one of the choices in part a. Examples of answers that may have been given include:

- Increases chance that some eggs will survive and develop into the next generation.
- Secure hold on tissue when animal coughs and sneezes – so will not be forced out of the animal.
- Fits into bronchii or narrow passages of respiratory tract.

5c. (0.34/2)

Two of:

- Dispersal – greater chance of finding a final host.
- Increases chance of survival in a disaster situation, e.g. if all of main hosts in an area die.
- Intermediate host may provide opportunity for dormant stage if conditions adverse.

In part a. some responses included features that were not that of the adult *Linguatula*, e.g. eggs attach to the grass. In some cases, student responses in part b. were not clearly expressed. A common incorrect statement included 'many eggs means that it is more likely for the eggs to find a suitable host'. Many responses to part c. lacked clarity and did not show the level of understanding required of a Year 12 student.

Question 6

6a. (0.14/1)

Tissue fluid *or* Fluid surrounding the internal cells of the body

6b. (0.80/1)

Insulin

6c. (0.47/2)

Glucagon production by pancreas increases
AND
Glucagon stimulates liver to covert glycogen to glucose and the glucose is released into bloodstream.

There were a variety of incorrect responses given in part a. Some included the organs as well as some fluid. Others concentrated on the body fluids but included the cytosol. Eighty per cent of the answers given in part b. were correct. In part c. most students knew the name of the hormone that produced the change in blood glucose concentration. The explanations given were often incomplete or incorrect.

Question 7

7a. (0.34/1)

Hypothalamus

7b. (0.88/3)

bi. skeletal muscles *or* skin arterioles *or* peripheral blood vessels *or* thyroid gland

bii. Answer must be clearly related to answer given in part i.
Skeletal muscle contractions (shivering), so generate heat
or Skin arterioles (or peripheral blood vessels) constrict – less blood near surface, less heat lost from skin
or Thyroid gland produces thyroxin, which leads to general increase in metabolism, so more heat generated within body.

The most common incorrect answer to part a. was the skin. Some students in part bi. gave the response rather than the effector. Students need to be reminded to read the questions carefully. To gain full marks the answer to part bii. must have included a reference to heat being either produced or less being lost.

Question 8

8a. (0.60/1)

Reduced rate of conduction of impulse
OR
Reduced coordination of nerves because nerves poorly insulated from each other – short circuiting may occur.

8b. (0.48/2)

When the body fails to identify a compound as self it produces antibodies against the compound
AND
We are told MS is an autoimmune disease in which myelin is damaged, so it is reasonable to expect antibodies against myelin. Antibodies are suitable to use as indicator.
OR
Myelin damaged, therefore not identified as self
AND
Therefore, would expect antibodies against myelin.
Antibodies are suitable to use as indicator.

8c. (0.59/1)

Dendrites

8d. (0.56/2)

di. Neurone requires stimulation at a particular voltage before it responds. Voltage Y is at or above this level but voltage X is below.

dii. Neurones have no degrees of response – either respond or do not respond.

Sixty per cent of responses were correct in part a. Many responses simply restated the question in part b. and did not give an explanation. Fifty-nine per cent of students were correct in part c. In part di. reference had to be made to both voltage X and voltage Y for a response to be given full marks.

Question 9

9a. (0.66/1)

Aerobic respiration *or* cellular respiration.

9b. (0.48/1)

No energy expended or required for the transport of the material.

9c. (0.14/2)

Continual use of carbon dioxide to produce bicarbonate that can readily leave a red blood cell means that carbon dioxide will continually diffuse into a red blood cell from plasma.

AND

This creates a concentration gradient in which carbon dioxide is lower in plasma than it is in cells so carbon dioxide will move from cells into plasma.

9d. (1.40/2)

$6\ CO_2 + 6\ H_2O \longrightarrow C_6H_{12}O_6 + 6\ O_2$

9e. (0.73/1)

Increased the rate of photosynthesis.

9f. (0.06/1)

Chlorella has reached its maximum rate of production of carbonic anhydrase, hence level of carbon dioxide remains constant. Therefore, carbon dioxide becomes the limiting factor for photosynthesis.

9g. (0.56/1)

Reduced activity.

Sixty-six per cent of all responses were correct in part a. Incorrect responses included 'respiration' or 'anaerobic respiration'.

Part c. provided a challenge for many students. The conversion of CO_2 to HCO_{-3} and therefore the CO_2 concentration gradient produced was not recognised.

Part d. was straightforward and full marks were awarded to many responses.

Part f. was testing whether students could recognise the limiting factor, at 90 minutes, in this experiment. Few students could relate the constant concentration of carbonic anhydrase to constant levels of carbon dioxide. Incorrect responses to part g. included 'activity would be stopped' or 'enzyme would be denatured'. Other incorrect answers referred to the reaction and not the enzyme activity.

Question 10

10a (0.83/1)

Antigens

10b (0.93/2)

Antigens (or egg protein and sperm protein) identified as foreign

AND

Antibodies produced against the egg and sperm protein.

10c (0.17/1)

Plasma cells.

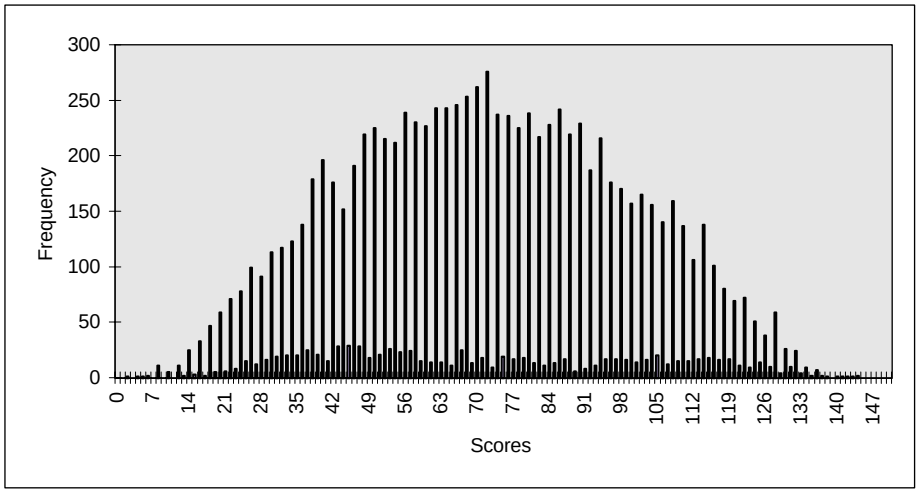
Part a. was well answered.

In Part b. a number of responses contained detail of the role of both B and T cells. Students are reminded that the number of marks awarded for the response should be used as a guide to the detail required in the answer. The most common answer not awarded a mark in part c. was B cells.

BI031 BIOLOGY WRITTEN EXAMINATION 1

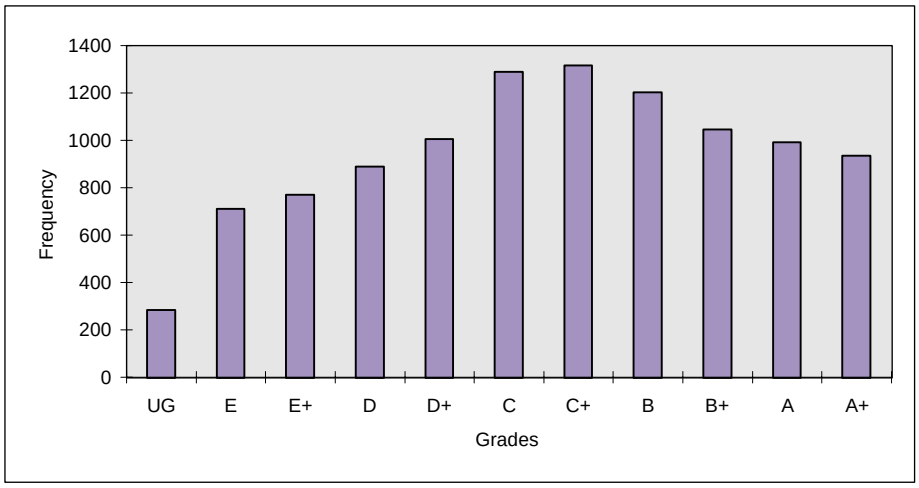
HISTOGRAM OF TOTAL SCORES 2000

Count 10445 Mean 71.69 Standard Deviation 27.47 NA Result 283



HISTOGRAM OF TOTAL GRADES 2000

Count 10445 Mean 5.59 Standard Deviation 2.79 NA Result 283



ENROLMENTS		%
Female	7580	70.7
Male	3140	29.3
Total	10720	

GLOSSARY OF TERMS

Count Number of students undertaking the assessment. This excludes those for whom NA was the result.

Mean This is the 'average' score; that is all scores totalled then divided by the 'Count'.

Standard Deviation This is a measure of how widely values are dispersed from the average value (the mean).