

Biology GA 1: Written examination 1

SPECIFIC INFORMATION

Section 1

Multiple choice

Correct responses to the multiple-choice questions

Question	Correct response	%	Question	Correct response	%
1	C	81	13	B	56
2	D	60	14	A	85
3	B	45	15	C	94
4	A	85	16	D	67
5	A	54	17	B	46
6	D	36	18	C	57
7	C	12	19	D	67
8	B	84	20	B	63
9	D	75	21	C	54
10	A	61	22	A	94
11	D	24	23	C	46
12	B	84	24	B	50
			25	C	72

Section 2

In Section 2 students should use the number of marks awarded to a question as a guide to the amount of information required in the answer. Some questions required two or more pieces of information before full marks were awarded. When students provided more information than was required they were not penalised unless the extra information contradicted something that they mentioned in the first part of their answer.

If a response required two pieces of information and the student gave two parts to the answer, one part contradicting the other, no marks were awarded.

For each question, an outline answer (or answers) is provided. In some cases the answer given is not the only answer that could have been awarded marks. Comments on student performance on the question follow the answers for each part of the question.

Question 1

a.

i. (Average mark 0.87/Available marks 1)

Cell S

ii. (1.35/2)

Two of:

- cell S is smaller in size
or
- cell S has no membrane bound organelles
or
- cell S has no distinct nucleus.

Generally this question was well answered by students. Some students were not awarded full marks in part ii as they referred to information that was not included in the diagram. Students are reminded to read all questions carefully and formulate their answer accordingly.

b.

i. (0.62/1)

The nucleus controls cellular processes **or** is the control centre of cell

ii. (1.67/2)

Any two of:

(presence of)

- cell wall
- chloroplasts
- large vacuole.

An answer of vacuole was not accepted in part ii. Animal cells can have vacuoles.

Question 2

a. (0.44/1)

Glucose **or** amino acids **or** fatty acids

A common incorrect response given was oxygen.

b. (0.61/1)

A veterinarian would most likely:

Examine the faeces of a dog for presence of hookworm eggs

or

Examine the faeces of a dog for presence of (undigested) blood.

A response of 'examine the faeces' was not awarded a mark. Students had to indicate what the veterinarian would be looking for in the faeces to indicate the presence of hookworm.

c. (0.46/1)

Feature: tooth-like structures

Explanation: to hold the hookworm in place in the intestine which prevents the hookworm from being swept along with the contents of intestine

or

Feature: large number of eggs

Explanation: ensures survival of the species because there is more chance that some eggs will develop into the next generation

Tooth-like structures was the feature chosen by many students. The explanation of why this made the hookworm a successful parasite was incomplete in many responses. A response 'the tooth-like structure allows the hookworm to attach itself to the lining of the intestine' was not awarded a mark. Explanations must build on the information given within the question and not just repeat information.

d. (1.38/2)

Two of:

- worm adult dogs of both sexes *or* keep pregnant unaffected dogs away from other dogs
- isolate dogs from other dogs
- dispose of the faeces
- don't let an affected mother feed the pups
- vaccination against the parasite
- treat pregnant female so she is free of disease when giving birth.

Most students could describe two methods that would be effective in controlling the spread of hookworm. Year 12 Biology students are expected to describe methods of control that are appropriate to the circumstances. With this in mind, 'killing dogs affected with hookworm' was a typical response not awarded a mark.

Question 3

a. (0.23/1)

Conduction **or** convection

Most incorrect responses tried unsuccessfully to describe how heat is lost from the seal's body rather than giving the name of a way in which heat can be lost. The amount of space left for the answer should have indicated to students that a detailed response was not required.

b. (0.91/2)

Feature 3: Higher oxygen consumption indicates **higher rate of aerobic respiration** and hence **greater production of metabolic heat**.

Feature 4: Greater amount of body fat means **more insulation** so **less heat will be lost** to surrounding water.

Both parts underlined in each feature needed to be included in the response before full marks could be awarded. Many students could give part of the answer for each feature. Twenty-five per cent of all responses were awarded full marks. Questions that require explanations often expect students to show connections between concepts or biological processes.

c. (0.56/1)

2°C

Most of the incorrect responses related to inaccurate scale divisions.

d. (0.23/1)

Temperature gradient between the temperature of the skin and the temperature of the water is very small so loss of heat from skin is minimised.

or

Difference in temperature between skin and water is very small so loss of heat from skin is very small.

Many students suggested that the low skin temperature may reduce heat loss but did not compare the skin temperature to the water temperature.

e. (0.65/2)

i.

When the seal is in icy waters and heat needs to be conserved, blood flows through X. The blood is further away from the skin therefore loss of heat is reduced.

ii.

When the seal is lying in the sun and at risk of overheating, blood flows through Y. The blood carries heat closer to the surface of the skin where greater loss of heat is possible.

Students who had a good understanding of the homeostatic mechanisms involved in core body temperature control gave correct responses.

Question 4

a. (1.58/3)

X – axon

Y – myelin sheath

Z – vesicle **or** synaptic vesicle

Most students correctly identified the axon and the myelin sheath. Fewer gave the correct name for the vesicle. A common incorrect answer was ribosomes. Students are reminded to read the question. The question asked for the name of a structure and not an organelle.

b. (0.28/1)

Structure Z contains acetylcholine *or* a transmitter substance *or* a neurotransmitter chemical.

Common incorrect answers to this part of the question included enzymes or ATP.

c. (0.35/1)

The compound diffuses across the synaptic gap and initiates contraction of muscle cell.

or

The transmitter substance diffuses across the end of the axon and small gap to the muscle cell. The substance initiates contraction of muscle cell.

Those students who correctly identified the compound in structure Z went on to give an adequate explanation of the function of the compound.

d. (0.31/1)

Transmission of nerve impulse and production of transmitter substance require high levels of energy which is obtained from ATP produced in mitochondria.

It was not enough to say the mitochondria produced ATP. A reason for the high energy demand of nerves cells needed to be given in the response. Students must be reminded to formulate their answer in terms of the given context.

Question 5

a. (0.89/2)

The phagocytes engulf bacteria **or** engulf foreign material **or** engulf infecting agent.

and

Enzymes destroy the ingested material *or* the phagocyte presents antigen on surface to T (helper) cell.

Many students could correctly describe the role phagocytes played in engulfing foreign material. Fewer could describe what happened to the material once the phagocyte had engulfed it.

b. (0.62/1)

Bone marrow

c. (0.73/2)

The B cells reproduce rapidly and give rise to **plasma cells that produce antibodies**

and

The B cells give rise to **memory cells** that are **important for future infections** of the same antigen.

There were some excellent answers to this question. Students not awarded full marks often failed to give sufficient explanation.

d. (0.6/1)

The person will be more susceptible to infection whilst having treatment

Some students incorrectly stated that the person would have no immune system during treatment. B cells are not the only cells involved in the body's defence against foreign material.

Question 6

a.

i. (0.54/1)

Xylem

Most students correctly identified the xylem as the vascular tissue affected by the fungus.

ii. (0.81/2)

Leaves show signs of wilting indicating lack of water.

and

Water is transported in xylem, blockage of xylem would reduce water transport through plant.

Many students stated that water is transported in the xylem. Most students did not make the connection between wilting and lack of water.

b. (0.6/2)

Fewer mitochondria means that less ATP is produced.

and

Energy dependent cellular processes cannot occur, the fungus will die.

Students demonstrated a clear understanding of the role of the mitochondria in the fungus. Few students were able to link the production of ATP with the energy dependent cellular processes and the subsequent death of the fungus.

Question 7

a.

i. (0.18/1)

Stomata would be in contact with air, not water. Greater exchange of gases possible.

This question was not well answered. Many students thought that the plant would not be able to obtain any carbon dioxide or oxygen from the water in which the pondweed was living.

ii. (0.31/1)

The large air spaces assist the leaf to float on the surface of the water.

b.

i. (0.11/1)

The pit acts as a humidity chamber where the water vapour gradient between leaf and outside reduced. The amount of water lost by the plant will be reduced.

A response that only indicated that the pits would reduce water loss was not sufficient to be awarded a mark. The important concept being tested was that the water vapour gradient was being changed.

ii. (0.39/1)

Thick cuticle reduces water loss through evaporation from the plant in a dry environment.

An answer that stated 'protection of the leaf' was deemed to be insufficient in detail and not awarded a mark.

Question 8

a. (0.37/1)

To act as a point of comparison with the vaccine injected mice (experimental group) to show that the vaccine enabled the mice to eliminate the bacterium.

Students needed to say more than 'a control for the experiment'. The understanding that the saline acts as a comparison to the trial vaccine needed to be shown in a response before it was awarded a mark.

b. (0.31/1)

The two proteins found normally on the surface of *Helicobacter pylori* cells.

Many responses stated the bacterium *H. pylori* as the antigen. The trial vaccine did not contain the bacterium and therefore responses such as this were not awarded a mark.

c. (0.55/2)

Two of:

- antibodies in the mice would attach to the surfaces of the bacteria
- memory cells stimulate the immediate production of large amounts of antibody
- macrophages engulf the antigen/antibody complexes.

There is still some confusion about the role of the plasma cells and the memory cells. Many responses contained insufficient detail. Students need to practise answering questions that require explanations.

Question 9**a. (2.36/4)**

Prior incubation temperature (°C)	New incubation temperature (°C)	Expected result (g/min)	Reason
0	40	1.0	Enzyme activity inhibited but not destroyed when enzyme incubated at 0.0°C so shows normal activity when later incubated at 40°C
70	40	0.0	Protein denatured at 70°C, denaturing not reversible so enzyme activity destroyed. Hence incapable of enzyme activity when later incubated at 40°C

Many students could predict the expected results. Fewer could go on to give adequate reasons for their predictions.

b. (0.3/1)

- Set up a number of tubes at 1°C intervals, each containing same ingredients as previously.
- Incubate tubes at one degree temperature differences from 30°C to 40°C.
- Measure the rate of production of sugar (g/min) in each tube.

It was clear from many responses that students were not familiar with experimental design.

c. (0.59/2)

Expect optimal temperature to be about 37°C.

and

Optimal enzyme activity at normal body temperature of humans.

Students need to be reminded to read the introductory paragraphs to the question carefully and relate the information given to the question. Students were told that the amylase enzyme is found in humans and needed to use this information in their response to the question.

STATISTICAL INFORMATION

Year 2001

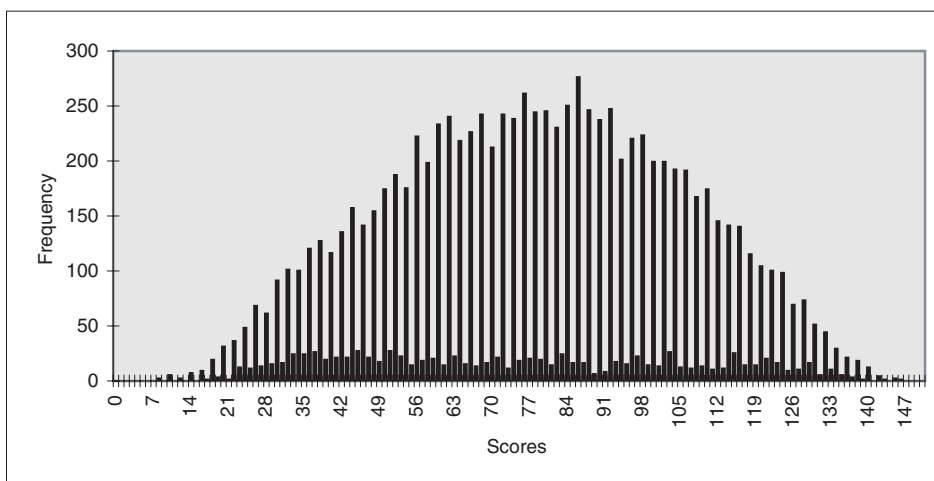
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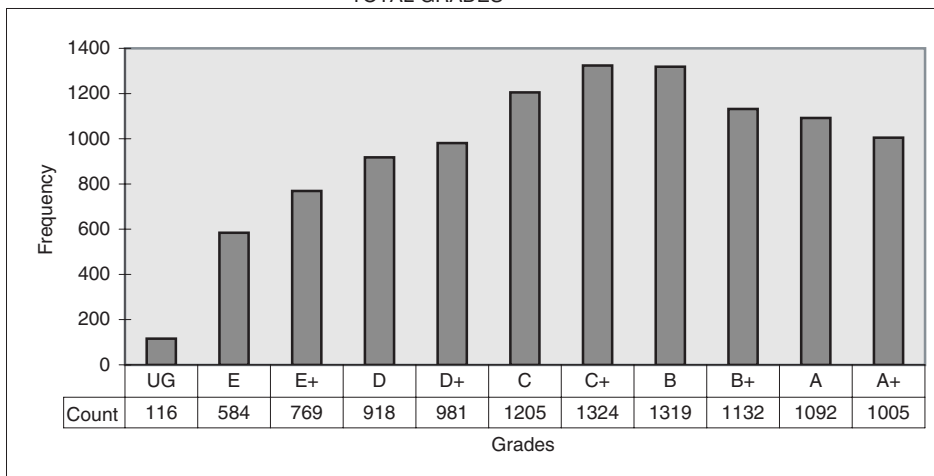
WRITTEN EXAMINATION 1

COUNT	10445	Female	7502 (71.8%)	Male	2943 (28.2%)
Mean score	77.6 (C+)	Standard Deviation	27.5		
Median Grade	C+	NA Result	240		

TOTAL SCORES



TOTAL GRADES



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).