

Unit 3 Biology

Revision Booklet 5 – Solutions

2012 – Question 6

Question 6ai.–ii.

Marks	0	1	2	3	Average
%	12	23	37	28	1.8

Question 6ai.

The maintenance of (either of):

- a relatively stable internal environment
- an internal environment within a narrow range of limits.

Question 6aai.

Variable: blood glucose

Explanation: glucose is required for cellular respiration, or too much can cause excessive urination

Other variables could have been oxygen, carbon dioxide or an ion; for example, Na⁺.

Careless errors such as choosing insulin rather than blood glucose as the variable or making vague statements such as 'so an organism can function correctly' meant many students were not awarded full marks.

Question 6bi.–ii.

Marks	0	1	2	Average
%	20	48	32	1.1

Question 6bi.

It detects the light (stimulus).

Question 6bii.

Either of:

- no, as the original stimulus is not reduced by the response
- yes, if the response such as constriction of the pupil reduces the original stimulus; for example, the light entering the eye.

Question 6c.

Marks	0	1	2	Average
%	27	23	50	1.3

Students needed to complete the table by giving two of the following aspects of the nervous and endocrine systems.

Aspect	Nervous system	Endocrine system
speed	fast	slow
duration	short	long
signalling molecule	neurotransmitter	hormone

This question required students to name an aspect common to both systems and to then compare that aspect; however, many students did not attempt the question. Students who did answer this question gave a variety of correct responses.

2009 – Question 6

Question 6

More careful reading of diagrams would have benefited many students, particularly in Questions 6a. and 6b.

Question 6a.

Marks	0	1	2	Average
%	53	31	16	0.7

Part 1: effector

Part 2: afferent (sensory) neuron

Most students recognised the information as an example of a stimulus response pathway and, without synthesising the material presented, incorrectly labelled part 1 as a receptor and part 2 as a connecting neuron. Students who followed the pathway illustrated were able to correctly label the parts.

Question 6b.

Marks	0	1	Average
%	33	67	0.7

Neurotransmitter

Question 6c.

Marks	0	1	Average
%	67	33	0.4

The neurotransmitter is being broken down by an enzyme.

Question 6di-ii.

Marks	0	1	2	Average
%	74	20	6	0.3

Question 6di.

This is an example of positive feedback, where the initial impulse passes through a series of neurons and refires the original neuron.

Question 6dii.

This system is important to rhythmic breathing as continual reinforcement ensures continual breathing.

This question was poorly answered as many students failed to fully explain the impulse being continually sent and also incorrectly stated that breathing would be constant, rather than continual.

2008 – Question 7

Question 7c.

Marks	0	1	Average
%	18	82	0.9

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Question 7d.

Marks	0	1	Average
%	53	47	0.5

Reflex arc

Question 7e.

Marks	0	1	Average
%	62	38	0.4

The rate of transmission of the nerve impulse would slow down, which could lead to a slower reaction and the person being burnt.

Many students failed to answer both parts of this question which clearly asked for a description of the damage **and** the effect on the person.

2007 – Question 9

Question 9a.

Marks	0	1	2	Average
%	17	41	42	1.3

ai.

Any specific time between 4 and 5 pm was accepted.

Answers that did not specify 'pm' were not awarded the mark. Students needed to use a ruler to work out the approximate times on the graph for this and part ii.

aii.

No, the highest temperature during the day occurred prior to this at about 1.30 pm.

It was important to relate the answer to the highest air temperature, not to the activity of the lizard.

Question 9b.

Marks	0	1	Average
%	63	37	0.4

The nervous system detects the skin temperature as there are receptors present **or** as it is a quick response.

It was not acceptable to state that sensory neurons detect the skin temperature; they convey the information. This part was not well answered. Many students scored zero as they incorrectly stated that it was the hormonal system and or involved the hypothalamus.

2006 – Question 6

Question 6

The majority of students showed little or no understanding of the nervous system and its involvement in control systems.

Question 6a.

Marks	0	1	2	3	4	Average
%	57	20	19	2	1	0.7

point R	Signalling molecule	neurotransmitter, or an appropriate specific transmitter such as noradrenaline or acetyl choline
	Type of cell producing the molecule	neuron, nerve cell or sensory neuron
point S	Signalling molecule	neurohormone, or an appropriate specific neurohormone such as prolactin releasing hormone or antidiuretic hormone (ADH)
	Type of cell producing the molecule	neurosecretory cell or neuron

Point R was much better understood than point S.

Question 6b.

Marks	0	1	2	Average
%	58	39	3	0.5

Two points were required to be made.

- It provides a greater level of control, or balanced control. Alternatively, students could make some reference to homeostasis.
- Multiple levels of stimulation/inhibition, or fine level of control, or some aspect of small change in level of stimulus.

2005 – Question 6

Question 6

6a–b

Marks	0	1	2	Average
%	38	47	15	0.8

6a

Chemical M diffuses across the small gap between the end of the nerve axon from which it is secreted and makes contact with the target cell.

Students needed to identify that chemical M was a neurotransmitter. The way in which the neurotransmitter crosses the synaptic gap was not well understood by many students.

6b

Chemical N diffuses from the bloodstream into tissue fluid and makes contact with the target cell.

Students needed to identify chemical N as a hormone. This question was correctly answered by the majority of students.

6c

Marks	0	1	2	Average
%	9	51	41	1.4

6ci.

The nervous system

6cii.

Messages are carried in the form of electrical impulses from one nerve cell to another and they move much more rapidly than blood in the bloodstream.

Many students correctly identified the nervous system as the system with the quicker response; however, fewer students could describe a characteristic that made the response time quicker. Many made the mistake of simply restating what was given in the stem of the question and could not be awarded a mark.