

VCE Biology Unit 2

Written Examination

Suggested Solutions

SECTION A: MULTIPLE-CHOICE QUESTIONS

1	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
2	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
3	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
4	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input checked="" type="checkbox"/> D
5	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
6	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
7	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
8	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
9	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
10	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
11	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
12	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
13	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D

14	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D
15	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input checked="" type="checkbox"/> D
16	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
17	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
18	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
19	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
20	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
21	<input type="checkbox"/> A	<input checked="" type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
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23	<input type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input checked="" type="checkbox"/> D
24	<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
25	<input type="checkbox"/> A	<input type="checkbox"/> B	<input checked="" type="checkbox"/> C	<input type="checkbox"/> D

Question 1 A

The preferred niche provides the optimal conditions, and outside this, the marginal niche, is the tolerance range.

Question 2 B

As the response is unconscious, the information only travels to the spinal cord – the brain is not involved. It is not negative feedback as the response does not alter the initial stimulus and therefore, it is also not homeostatic.

Question 3 C

Q is a sensory neuron (afferent) as it is coming from the retina (a receptor), and *S* is a motor (efferent) neuron as it is going to the eyelid muscle, an effector.

Question 4 D

R, an interneuron, is only found in the CNS. Sensory neurons, *Q*, and motor neurons, *S*, are in the peripheral nervous system.

Question 5 A

The temperature fluctuation is quite small, indicating that the temperature of the organism is kept relatively stable and hence under homeostatic control.

Question 6 C

This hormone increases absorption of water by the kidney tubule. Thyroxine is responsible for cellular metabolism, testosterone for male secondary sex characteristics and insulin for blood glucose regulation.

Question 7 A

Ethylene is also responsible for fruit and leaf fall, auxin is responsible for geotropic and phototropic responses, abscisic acid is responsible for dormancy and regulating stomata, and gibberellins are responsible for general elongation.

Question 8 C

The venule gains the heat lost from the artery, which reduces the temperature difference of blood returning to the body and allows the penguin to stand on ice for long periods. This is a method of conserving heat, not regulating heat.

Question 9 A

Huddling reduces overall heat loss, rather than gaining more heat from conduction. Penguins would rotate positions and not 'sacrifice' some members on the outer. Though this behaviour would be beneficial to prevent attacks from predators, it is not relevant to this question.

Question 10 B

From the information, it can be seen that 12 hours of continuous darkness is necessary for flowering to occur, and 15 hours is too long. **A** has two periods of 6 hours, not 12 continual. **C** does not have continual darkness due to the flash, and **D** also has 15 hours, which is too long.

Question 11 C

Phototropism is a growth response to light, geotropism to gravity. Circadian events are daily events. The plant is responding to a critical amount of darkness.

Question 12 B

Ovulation is consistent, however, it can be seen from the data that in two harsh conditions diapause has lengthened.

Question 13 A

The harsh conditions would trigger a response, probably hormonal, in the mother to cease development of the foetus.

Question 14 C

The mistletoe is a parasite of the Eucalyptus and both the mistletoe and the mistletoe bird benefit from having the seeds spread and gaining food respectively.

Question 15 D

In commensalism, one species gains benefit and the other is not affected, e.g. a bird using the hollow of a tree for nesting: the bird gains benefit and the tree is unaffected. In all the other symbiotic relationships, one species gains benefit and the other is harmed.

Question 16 B

The nitrogen in the plants is returned to the air as N_2 by denitrification brought about by bacteria.

Question 17 A

The bacteria take in the nitrogen gas and convert it to ammonia to be used by the plants in the process of nitrogen fixation.

Question 18 A

The trout ate the yabby (first order carnivore), which ate the mosquito larvae (herbivore), which ate the producer.

Question 19 B

The snake is the top order consumer and as a consequence, via bioaccumulation, it would have the highest concentration.

Question 20 B

The silver perch feeds exclusively on tadpoles, as shown by this food web. All other animals given do not rely solely on the tadpole.

Question 21 B

From the information given, 65% is converted to heat, 25% is passed onto the next trophic level, and 10% ends up in detritus.

Question 22 B

This value is what is incorporated into the organisms, only part of this is passed onto the next trophic level, or used by organisms, or released via cellular respiration.

Question 23 D

Energy is neither created nor destroyed, but is transformed.

Question 24 A

Only 20% of the energy reaching the ecosystem is absorbed, 80% is reflected. Only 5% absorbed is incorporated into producers and only 25% of this is passed on.

Question 25 C

An ecosystem consists of a biotic component, the community and abiotic environmental factors.

SECTION B: SHORT-ANSWER QUESTIONS**Question 1**

- a. Their large ears would assist it to find prey at night. 1 mark
 Their large eyes improve its vision at night. 1 mark
Or any other suitable answer.
- b. Blood would flow close to the air and the large surface area would allow for heat to be lost to the environment or lack of hair would allow heat to be lost. 2 marks
Or any other suitable answer.

Question 2

- a. homeostasis 1 mark
- b. *Any two of:*
- panting – rapid passing of air over tongue to cool down
 - seeking a cool place – increase conduction of heat in order to cool down
 - increasing surface area to volume ratio – to radiate more heat
- Or any other suitable answer.*
- 2 marks
1 mark for each behaviour and description
- c. i. structural or physical 1 mark
 ii. physiological or internal functioning 1 mark

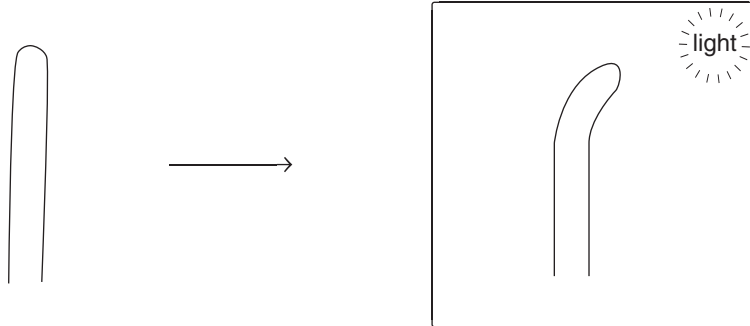
Question 3

- a. i. imprinting 1 mark
 ii. associative learning/classical conditioning 1 mark
 iii. observational learning 1 mark
 iv. trial and error 1 mark
- b. the situation in part i only 1 mark
- c. i. the distance the birds can reach from their nest either with beak or wing 1 mark
 ii. A territory is an area that has resources for the members that defend it. 1 mark

Question 4

- a. tropism 1 mark
- b. At day 5, the shoot is responding to gravity, as the seed is underground. 1 mark
At day 7, the shoot responds to light, as the shoot has now emerged from the soil. 1 mark

c.



The coleoptile bends towards the light or elongation of cells occurs in the side away from the light.

2 marks

*1 mark for correct drawing**1 mark for explanation*

- d. auxin 1 mark
- e. The coleoptile will not respond to the light (or keep growing upwards). 1 mark
No bending occurs as the light is not detected by the shoot tip and there is no favoured production of auxin on the shaded side of the coleoptile. 1 mark

Question 5

- a. Either one of:
- snails and worms for dead fruit and leaves
 - blackbirds and rainbow lorikeets for fruit
- Or any other suitable pair.*
- 2 marks
- b. i. second order consumer or first order carnivore 1 mark
ii. detritivore or scavenger 1 mark
iii. decomposer 1 mark
- c. *Any two of:*
- water availability
 - sunlight
 - carbon dioxide levels
- Or any other suitable response.*
- 2 marks
1 mark for each factor
- d. i. Possums would eat fruit in summer and leaves during spring and summer. 1 mark
They would not feed on this tree in autumn and winter. 1 mark
ii. hibernation or migration 1 mark

Question 6

- a. i. the number of organisms an area can support indefinitely 1 mark
 ii. 100 rabbits per hectare, the lowest value on the graph 1 mark
- b. No, there are two foxes per hectare, even though rabbit numbers fluctuate, there must be another food source; 1 mark
 however, when rabbit numbers are high for a long period, fox numbers increase. 1 mark
- c. As pasture cover increases, rabbit numbers increase; 1 mark
 however, there is a delay before numbers increase. 1 mark
- d. death rate and birth rate 2 marks
1 mark for each factor

Question 7

- a. i. 100
 ii. *Any two of:*
- Only the large animals may be found and these may have different proportions in the population.
 - Marking may affect the animal, e.g. camouflage.
- Or any other suitable answer.*
- 2 + 2 = 4 marks
- b. i. Take a sample of known size and count the number of trees; repeat the process, gain an average and then work out the total for the total area under investigation.
Or any other suitable method.
- 2 marks
- ii. Take a sample of water of known volume; filter, weigh contents and work out number of organisms and then work out for total volume.
Or any other suitable method.
- 2 marks