Neap:

BIOLOGY VCE UNITS 3&4
DIAGNOSTIC TOPIC TESTS 2017

TEST 4: CELLULAR SIGNALS

TOTAL 40 MARKS (45 MINUTES)

Student's Name: _____ Teacher's Name: _____

Directions to students

Write your name and your teacher's name in the spaces provided above.
Answer all questions in the spaces provided.

SECTION A – MULTIPLE-CHOICE QUESTIONS

Instructions for Section A

Choose the response that is **correct** or that **best answers** the question.
A correct answer scores 1; an incorrect answer scores 0.
Marks will **not** be deducted for incorrect answers.
No marks will be given if more than one answer is completed for any question.
Unless otherwise indicated, the diagrams in this booklet are **not** drawn to scale.

Question 1

The nervous and endocrine systems are the two major regulatory systems of the body.

Both systems

A. take the same time to respond to a stimulus.

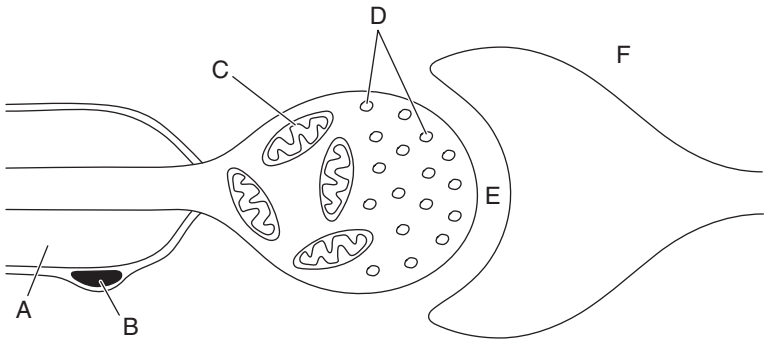
B. have the same duration of response to a stimulus.

C. use the blood for the transport of their chemical signals.

D. release chemical signals that act on tissues they control.

Question 2

Consider the diagram below of a nerve cell synapse.



Select the correct statement regarding the above nerve cell synapse.

A. Structure B is a mitochondrion.

B. Structure A is an axon.

C. Structure D is a synaptic vesicle.

D. Structure F is the presynaptic neuron.

Question 3

A builder steps on a nail. His leg muscles quickly move his foot.

In this response, the muscles are

A. motor neurons.

B. effectors.

C. receptors.

D. sensors.

Question 4

Synaptic signalling involves

A. neurotranducers.

B. neurotransmitters.

C. endocrine signals.

D. exocrine signals.

Question 5

Cells have surface cell receptors.

The signalling molecules that dock with these receptors are

A. saccharide-based.

B. lipid-based.

C. protein-based.

D. steroid-based.

Question 6

Second messenger molecules help to

A. amplify the message.

B. stop the message entering the cell.

C. send the message out of the cell.

D. suppress the message.

Question 7

Different cells in the body interact through the action of signalling molecules.

These either bind to surface cell receptors on the membrane or do which of the following?

A. pass through the cell membrane

B. bind to an intracellular receptor

C. trigger a response from the cell

D. all the above

Question 8

Hydrophobic signalling molecules travel in the body

A. by themselves.

B. using a carrier.

C. using enzymes.

D. in groups.

Question 9

When cells respond to an extracellular signal, the message is converted into a response.

This process is called signal

A. reception.

B. amplification.

C. transduction.

D. transformation.

Question 10

For a cell to respond to a particular signalling molecule, which of the following statements must be true for this cell?

A. It contains non-specific receptors.

B. It is the site of production of the signalling molecule.

C. It contains a specific receptor for the signalling molecule.

D. It contains no specific receptors.

Question 11

Which of the following processes involves the binding of a signalling molecule to another to enhance the message?

A. signal deactivation
B. signal response
C. signal breakdown
D. signal amplification

Question 12

Which of the following described a signal cascade initiated by adrenaline or thyroxine?

A. begins when the signalling molecule binds to the specific receptor.
B. involves the activation of a second messenger molecule.
C. involves the activation of a series of enzymes in a sequence.
D. all the above

Question 13

A hormone can be considered to be a/an

A. signalling molecule.
B. receptor molecule.
C. sucrose molecule.
D. ATP molecule.

Question 14

Erythropoietin is a protein-based hormone which would

A. pass through the plasma membrane and bind to receptors in the cytosol.
B. initiate transcription of a specific section of DNA.
C. bind to receptors associated with protein molecules in the plasma membrane.
D. be transported into the cell, where it would be part of a cascade of events bringing about a cellular response.

Question 15

Plant hormones typically produce a response in the plant that we can observe.

This response involves

A. plant die-back.
B. specific plant growth.
C. photosynthesis.
D. cellular respiration.

SECTION B – SHORT-ANSWER QUESTIONS

Instructions for Section B

Answer **all** questions in the spaces provided. Write using blue or black pen.
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Question 1 (3 marks)

On some farms, there is a movement away from using chemical sprays to kill insects such as codling moths. Instead the farmers are making use of pheromone traps as a control method. The pheromones used are produced artificially, but are identical to those produced by the female moth to attract males when she is sexually receptive. The caterpillars, which are the moth larvae developed from the eggs laid by the female moth, cause extensive damage to the fruit.

a. Explain how the use of the artificial pheromone would ultimately lead to less fruit destruction. 1 mark

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b. Explain why the male codling moth responds to the artificial pheromone. 1 mark

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_____

c. Would you expect the artificial pheromone to work against other pests in an orchard (for example the citrus gall wasp)? Explain. 1 mark

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Question 2 (3 marks)

Name the major components of a neuron.

_____

_____

_____

Question 3 (2 marks)

What is a nerve impulse and how is one passed along a nerve?

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Question 4 (1 mark)

How is a nerve impulse passed from one nerve to the next?

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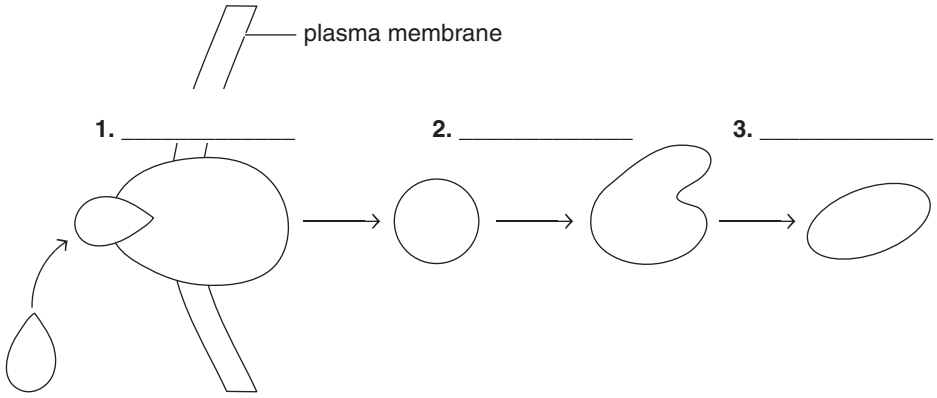
Question 5 (6 marks)

The following diagram is related to cellular signals.

The first stage occurs on the outside of the plasma membrane, the second stage occurs within the plasma membrane and in the cytoplasm, the third stage occurs in the cytoplasm.



a. Fill in the missing words in the spaces provided that best defines each process. 3 marks

b. Describe each stage in the space provided.

1. 1 mark

_____

2. 1 mark

_____

3. 1 mark

_____

Question 6 (4 marks)

a. If **Question 5** described one type of cellular signal, what property of that signal made it impossible to enter directly into the cytoplasm and why? 2 marks

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b. Give an example of another type of cellular signal that can directly enter into the cytoplasm and explain how this signal can do so. 2 marks

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Question 7 (6 marks)

a. Name the **two** ways in which programmed cell death can occur. 2 marks

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b. Explain the difference between these two pathways. 2 marks

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c. What is the difference between tumour cells and normal body cells in relation to programmed cell death? 2 marks

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