



## **FACULTY OF SCIENCE**

### **DEPARTMENT OF ZOOLOGY**

<b>MODULE</b>	<b>PHS2B01/PHS02B2</b>
<b>CAMPUS</b>	<b>APK</b>
<b>EXAM</b>	<b>Exam</b>

**DATE: 14 November 2019**

**SESSION: 8:30AM**

**ASSESSOR(S):**

**Prof. JC van Dyk & Mrs. R Lukhwareni**

**INTERNAL MODERATOR:**

**Dr. J Das Neves**

**DURATION: 2 hours 30 min**

**MARKS: 100**

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**NUMBER OF PAGES INCLUDING THIS ONE: 3**

**INSTRUCTIONS:**

- 1. Answer all the Questions**
- 2. Answer sections A and B in separate answer books.**

## **Section A**

### **Question 1**

Stephen is visiting Inhaca Island and while walking on the beach stepped on a sharp shell with his left foot. A contralateral reflexed resulted.

1.1. Explain the reciprocal inhibition that took place as part of this reflex. (5)

1.2. For this reflex to have occurred, neurons had to communicate with one another. Explain the steps involved in the process of synaptic communication in detail. (8)

1.3. Simultaneously to the reflex, Stephen experienced a brief pain sensation as he stepped on the shell. Which somatic sensory pathway would have conducted the nerve impulse following the pain stimulus? Explain this pathway in detail. Also, incorporate the detailed pathway that sensory information will follow entering the spinal cord as part of your explanation. (15)

**[28]**

### **Question 2**

Discuss cranial nerves V and VII in terms of function, type, origin and destination. [ $\frac{1}{2}$ x16]

### **Question 3**

Thandi's doctor thinks she might have meningitis. He recommends that she goes for a lumbar puncture (collection of cerebral spinal fluid (CSF)) to make his final diagnosis. Give explanatory notes on the production and functions of CSF as well as its circulation, which will allow the doctor to collect the fluid from the lumbar region of the spinal cord. [10]

### **Question 4**

Eleven neurons synapse with a single neuron. Eight of the neurons release neurotransmitters that produce EPSPs at the postsynaptic membrane, and three of the neurons release neurotransmitters that produce IPSPs. Each of the 11 neurons release enough neurotransmitter to produce a 3mV change in potential at the postsynaptic membrane. Assume that spatial summation occurs and that threshold is set at -55mV.

4.1. How many of the excitatory neurons must be stimulated to produce an action potential in the postsynaptic membrane if all of the inhibitory neurons are stimulated? (1)

4.2. Explain your answer. (3)

**[4]**

**Sub Total: 50**

## **Section B**

### **Question 5**

While studying for this test, you hear a huge noise (breaking glass), only to find that someone is trying to break into your house and you are alone. Explain the bodily changes you will experience as part of your autonomic nervous system (ANS) being activated. Which part of the ANS is activated? **[12]**

### **Question 6**

6.1 Explain the steps involved in the process of hearing. **(½x12)**

6.2 Briefly discuss the process of bleaching and regeneration of visual pigments. **(½x12)**  
**[12]**

### **Question 7**

A patient with severe pancreatitis (inflammation of the pancreas) is told by his doctor to stop consuming a diet with a high sugar content:

7.1 Why is the doctor recommending this? **(2)**

7.2 Which disorder is this patient prone to develop? Explain your answer. **(2)**

7.3 Why would a patient with the disorder discussed in 7.2 urinate frequently and be constantly thirsty? **(2)**

**[6]**

### **Question 8**

Discuss the endocrine organs and hormones involved in the “Resistance Phase” of the General Adaptation Syndrome. **[10]**

### **Question 9**

Describe the chain of events the release of renin will initiate following a decrease in blood volume and blood pressure. **[10]**

**Sub Total: 50**

**Total: 100**