



FACULTY	Agriculture, Engineering & Natural Sciences
DEPARTMENT	Environmental Science
SUBJECT	Animal Form and Function
SUBJECT CODE	BLG 3611
DATE	May/June 2022
DURATION	3 hours
MARKS	120

WINTER EXAMINATION

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This question paper consists of three pages, including this cover page.

Instructions

1. Carefully read all the instructions.
2. The use of scientific calculators is permitted during the examination.
3. There are two sections in this paper.
4. Answer ALL questions from Section A and only ONE question from Section B.
5. Section A = 90 marks
6. Section B = 30 marks

UNIVERSITY OF NAMIBIA EXAMINATIONS

Section A

Answer all the questions in section A

Question 1 (15 marks)

- 1.1 The hormone secreted by the hypothalamus called _____ stimulates the onset of puberty. /1/
- 1.2 Name the different types of phagocytic cells found in animals. /4/
- 1.3 List the blood vessel types, from descending lumen size, associated with vertebrate circulation. /3/
- 1.4 From the choices below, which is the best surface area to volume ratio for the most efficient diffusion into an organism? /1/
- A. 1:3
 - B. 2:6
 - C. 1:0.35
 - D. 4:13
 - E. 1:1
- 1.5 The BCG vaccination is administered after birth to fight against tuberculosis (TB). /2/ However, it has been reported to offer broad protection to viral respiratory infections such as those caused by SARS and COVID-19. Countries without universal policies of BCG vaccination (Italy, Netherlands, and USA) have been more severely affected by COVID-19 compared with countries with universal and long-standing BCG policies, as found in many African countries. Formal studies still need to be conducted, but initial trends are promising.
- Why can a vaccine administered at birth offer immunity to an adult?
- 1.6 What are the common features of exchange surfaces? /3/
- 1.7 Homeostasis can adjust to changes in the external environment in a process called _____ /1/
- Subtotal /15/**

Question 2 (20 marks)

- 2.1 Identify and describe the **four** (4) feeding mechanisms of animals, providing an example of each. /12/
- 2.3 The mammalian digestive tract has been called an extension of the outside world that you enclose in your body. Briefly, what does this statement mean? Consider what would happen if you swallowed a coin. Is the coin ever "inside your body"? /4/
- 2.4 Briefly compare the number of nephrons and the rate of urine production in freshwater and marine fish. /4/
- Subtotal /20/**

Question 3 (12 marks)

- 3.1 List the cells found in human blood and their function. /6/
- 3.2 What tissue lines the lumen of blood vessels, and how does its structure suit its function? /3/
- 3.3 List any **three** (3) active or passive physiological processes that occur during a breath-hold challenge to optimise breath-holding ability. /3/
- Subtotal /12/**

Question 4 (28 marks)

- 4.1 Neurons have four functional zones, and each performs a task required for communication. What are these **four** (4) zones, and explain what structural features found in each allow it to perform its function? /16/
- 4.2 Explain why is it so difficult to localise sound with only one ear. How does having two ears help to localise sound? /12/
- Subtotal /28/**

Question 5 (15 marks)

- 5.1 Namibia has imposed travel regulations to prevent active COVID-19 cases from entering the country. A traveller arrives at the Namibian border with a negative antibody COVID-19 test. The border officials will not let the traveller enter Namibia until he produces a negative antigen COVID-19 test. The traveller becomes angry and asks that they explain why they will not accept his present negative test results. They call you, a young scientist, to explain why the antibody test is not accepted and how this differs from an antigen test. Write your response in the space below. /5/
- 5.2 Briefly compare the mode of action of steroid hormones and non-steroid hormones in influencing target cells for responses? /8/
- 5.3 State **two** (2) osmoregulatory adaptations of ostriches to the hot and dry Namib Desert. /2/
- Subtotal /15/**
Total Section A /90/

Section B

Answer **only one** question from section B

Question 6 (30 marks)

Describe the process of oogenesis and the role of hormones in humans. /30/

OR

Question 7 (30 marks)

- 7.1 Identify **five** (5) general adaptations that facilitate thermoregulation in endotherms and provide a detailed example of each adaptation by referring to a specific animal species. /15/

AND

- 7.2. Explain what happens in time and space (along the axon) once an action potential begins? /15/

Total Section B /30/
Grand Total /120/

End of Question Paper