

<b>FACULTY</b>	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
<b>DEPARTMENT</b>	ENVIRONMENTAL SCIENCE		
<b>SUBJECT</b>	BEHAVIOURAL ECOLOGY		
<b>SUBJECT CODE</b>	EBL3812		
<b>DATE</b>	NOVEMBER / DECEMBER 2021		
<b>DURATION</b>	<b>3 Hours</b>	<b>MARKS</b>	<b>120</b>

### REGULAR EXAMINATION

**Examiner:** Dr. L. A. Hart (University of Namibia) & Dr. D. Kavishe (University of Namibia)

**Moderator:** Prof. C. T. Downs (University of KwaZulu-Natal)

This examination consists of 5 pages including the front page

**UNIVERSITY OF NAMIBIA EXAMINATIONS**

**SECTION A: COMPULSORY QUESTIONS (Total 60 marks)**

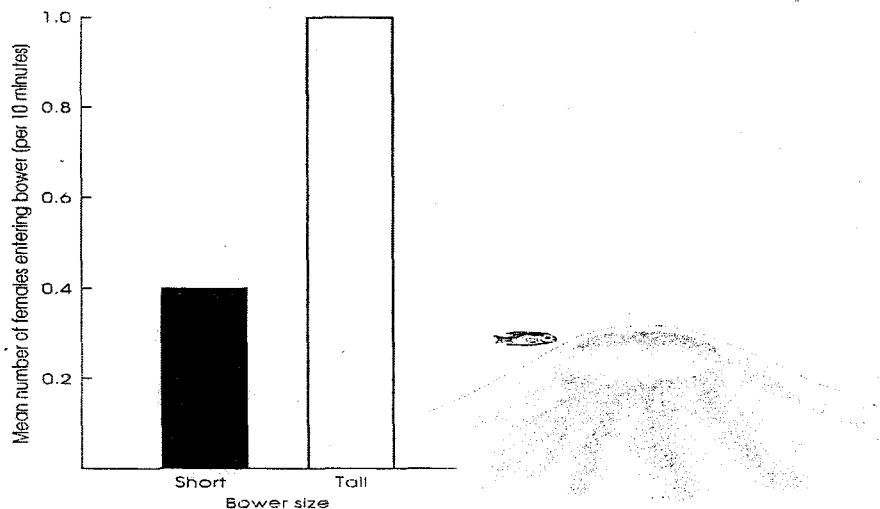
Answer ALL questions in this section

**Question 1 [7 marks]**

- (a) What are the three (3) main processes that are involved in effective communication when animals use signals? [3]
- (b) State two (2) types of associative learning and two (2) types of non-associative learning. [4]

**Question 2 [14 marks]**

The African cichlid fish, *Cyrticara eucinostomus*, builds elaborate display sites that resemble miniature volcanoes (or bowers) on the floor of Lake Malawi. Females visit these bowers only to receive sperm from males to fertilise their eggs, which they brood in their mouths. Males contribute no parental care.



**Figure 1.** Mean number of females entering bowers of different sizes built by male cichlids in Lake Malawi.

- (a) Briefly describe what the results presented in Figure 1 reveal? [2]
- (b) Suggest the adaptive value of the behaviour of male cichlid fish. [4]
- (c) Briefly describe the following mating systems: [8]
- (i) Polyandry
  - (ii) Polygamy
  - (iii) Polygyny
  - (iv) Lek

**Question 3 [15 marks]**

(a) Briefly explain the adaptive significance of group living in animals. [8]

In some bird species, those that do not breed help breeding females to raise their young. Figure 2 below shows the percentage of non-breeding birds that helped with raising young in species X.



Figure 2. Percentage of non-breeding birds that helped with raising young in species X.

(b) Briefly describe the trends based on the results presented in Figure 2 (2).

(c) Justify the behaviour of helpers on the basis of adaptive significance of behaviour. (5)

**Question 4 [8 marks]**

You observe a bird, e.g. a starling (*Sturnus vulgaris*), searching in the grass for food. The starling walks along, pausing every now and then to probe into the ground. Sometimes it succeeds in finding a prey item, such as a beetle larva, and eventually, when it has collected several prey items, it flies back to the nest to feed its hungry brood.

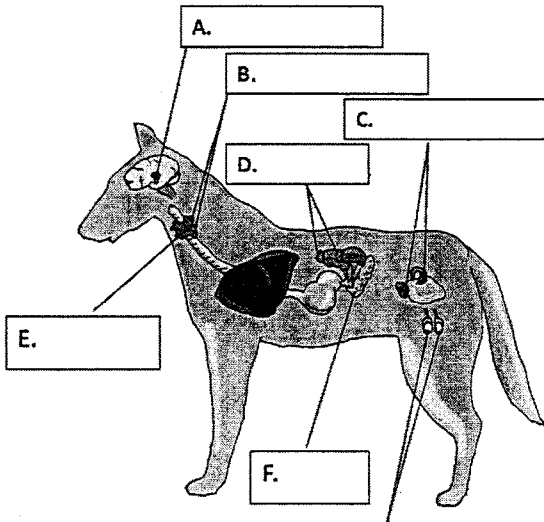
Explain the behaviour of the starling collecting food and flying to feed young in the nest using Tinbergen's four questions (Please do not list the questions). [8]

**Question 5 [6 marks]**

List three (3) predatory and three (3) anti-predatory behaviours that some animals display in nature. (6)

**Question 6 [10 marks]**

(a) Provide labels for the glands / organs A-F in the image below. [6]



(b) The nervous system and the endocrine system both influence animal behaviour. Differentiate the nature and effect of signals from the nervous and endocrine systems. [4]

**SUBTOTAL: 60 MARKS**

**SECTION B: CHOICE QUESTIONS (Total 60 marks)**

Answer any TWO questions from this section.

**Question 1 [30 marks]**

Write an essay, discussing interspecific and intraspecific sexual selection in animals.

OR

**Question 2 [30 marks]**

Write an essay to illustrate the role of the endocrine system in regulating or influencing the behaviour of animals. In your essay, use the courtship and reproductive cycles in ring doves (*Streptopelia risoria*) as the main example. Supplement your answer with one (1) additional specific example of your choice.

OR

**Question 3 [ 30 marks]**

A laboratory study was carried out in which bluegill fish were placed in large aquaria and were allowed to forage in low plant cover plots or high plant cover plots. Later, predatory bass fish were introduced to the aquaria. The mean numbers of foraging choice which the bluegill fish made in the absence and presence of the predator are presented in Figure 3 below.

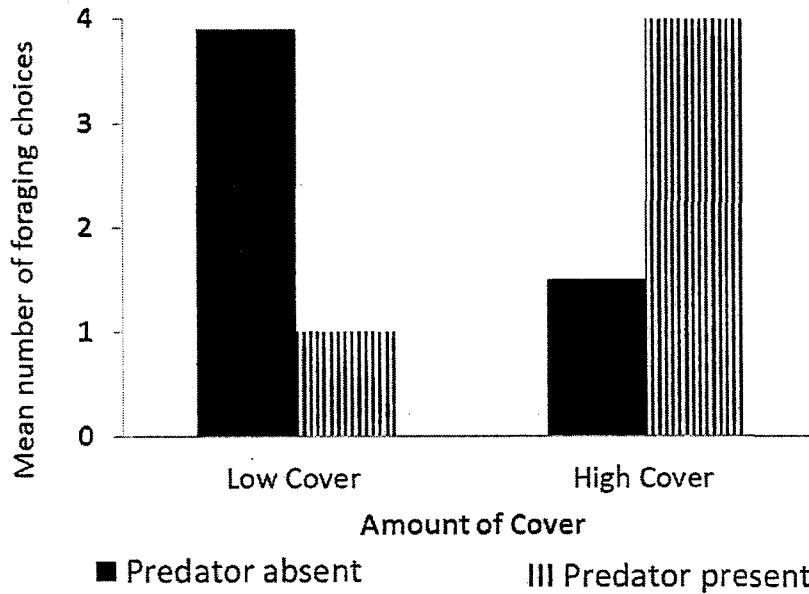


Figure 3. Mean numbers of foraging choice which the bluegill fish made in the absence and presence of the predator.

- (a) Briefly describe trends that are shown in Figure 3 regarding foraging choices. [4]
- (b) Describe why the bluegill displays this behaviour. [12]
- (c) Discuss the optimal foraging theory and its role in feeding behaviour. [10]
- (d) Explain how this theory is applied in the example of foraging in the bluegill fish. (4)

**TOTAL MARKS**

**SECTION A = 60 MARKS  
SECTION B = 60 MARKS  
GRANDTOTAL = 120 MARKS**

\*\*\*\*\*END OF EXAMINATION\*\*\*\*\*