UNAM
UNIVERSITY OF NAMIBIA

FACULTY	AGRICULTURE, ENGINEERING & NATURAL SCIENCES		
DEPARTMENT	ENVIRONMENTAL SCIENCE		
SUBJECT	BEHAVIOURAL ECOLOGY		
SUBJECT CODE	EBL3812		
DATE	NOVEMBER 2022		
DURATION	3 hours	**MARKS**	100

REGULAR EXAMINATION

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

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

This examination consists of **five** (5) pages, including the front page

Instructions

- Carefully read all the instructions.
- There are **two** sections in this paper.
- Answer **ALL** questions from Section A and **TWO** questions from Section B.
- Section A = 50 marks
- Section B = 50 marks
- The use of calculators is allowed

UNIVERSITY OF NAMIBIA EXAMINATIONS

SECTION A: COMPULSORY QUESTIONS (Total 50 marks)

Answer **ALL** questions in this section

Question 1 (10 marks)

1.1 Tabulate the differences between innate versus learned behaviours. (8)

1.2 "Behaviour can also be shaped by natural selection". List **TWO** requirements for natural selection to shape behaviour in a population. (2)

Question 2 (10 marks)

With reference to the image of the cow and calf (right), answer the following questions.

2.1 Identify internal and external stimuli that could elicit parent-offspring bonding. [4]

2.2 Briefly describe the mechanism involved with parent-offspring bonding. [6]

Question 3 (10 marks)

The 2021 Behavioral Ecology students carried out a study in which they were presented with 15 pictures, one at a time, each being presented for 30 seconds. After the 15th picture was presented, students were asked to write down the pictures they could remember from the 1st to the 15th picture. Figure 1 below presents the class's results.

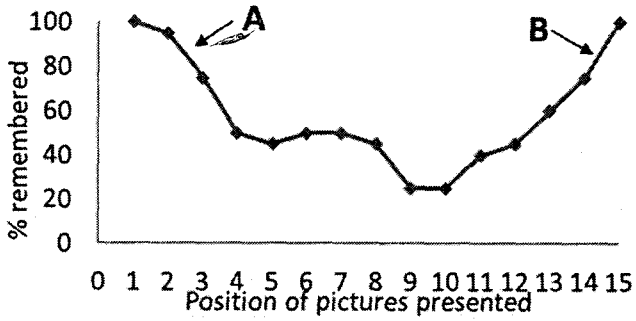

Figure 1. The percentage (%) of the 2021 class that remembered the pictures which were presented from the 1st to the 15th image.

3.1 What trends do you observe in Figure 1? [3]

3.2 Identify and describe terms that are used to refer to A and B in Figure 1? [4]

3.3 From the list below, identify three statements that are true regarding the characteristics of Fixed Action Patterns (FAP's). [3]

A. The behaviour varies between members of a species
B. The behaviour does not require prior experience
C. FAP's are innate behaviours
D. The behaviour requires prior experience
E. FAP's must be learned
F. The behaviour requires several inputs before it can be completed
G. Stimulated by a sign stimulus
H. FAP's are purely driven by hormonal stimuli

Question 4 (10 marks)

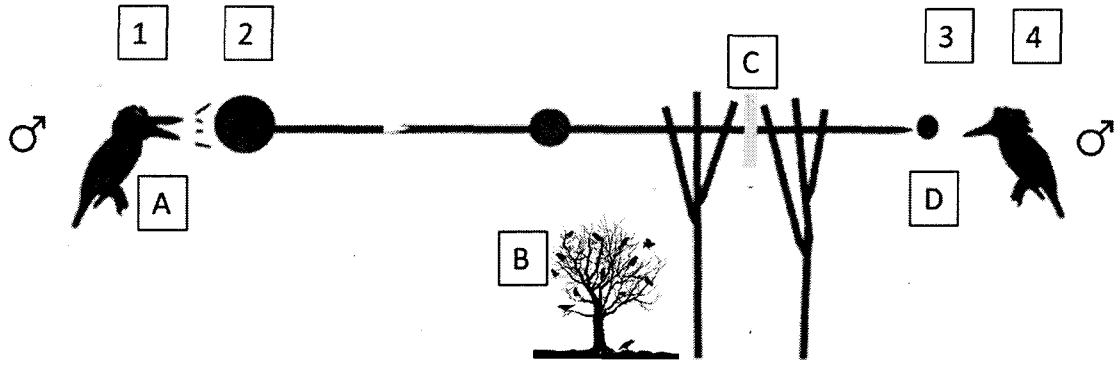

Figure 2. Communication pathway between two birds of the same sex and species.

In the communication pathway above A = _____, B = _____, C = _____, D = _____. Bird 'A' needs to first _____1_____ the signal and then _____2_____ it; then Bird 'B' will _____3_____ and finally _____4_____ the call.

4.1 Using Figure 2 and the sentences above, provide labels for A – D and 1 – 4. [8]

4.2 State the reason for the communication observed in Figure 2 and identify the channel used. [2]

Question 5 (10 marks)

Male sex pheromones in the noctuid moth *Heliothis virescens* perfume (are secreted over) the female moth after mating. Figure 3 below shows the amount of the pheromone (16:OAc) released by the male when it is with females of varying states / conditions of mating.

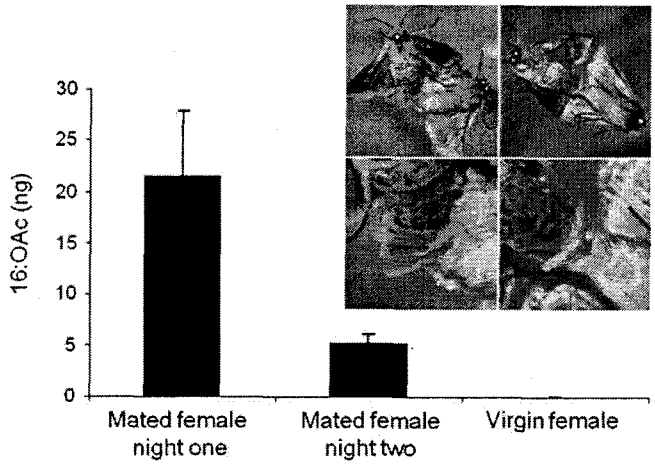

Figure 3. Amount of male sex pheromone (16:OAc) released on female moths at various stages of mating.

5.1 Based on Figure 3, answer the questions below.

(a) What type of behaviour is being displayed by the male moth to ensure his mating is successful? [1]

(b) What possible effects will the pheromones have on both male and female moths? [2]

(c) Discuss possible reasons for the trends observed in Figure 3. [4]

5.2 (a) Widowbirds are sexually dimorphic. During the breeding season, males change colour (from brown to black) and grow long tails (20 - 50cm). During non-breeding periods they resemble females (brown, with short tails). Why do males not maintain their breeding appearance throughout the year? [2]

(b) Which principle proposed by Zahavi would apply if this plumage was an honest signal of a survival cost to the male bird? [1]

SECTION B: CHOICE QUESTIONS (Total 50 marks)

Answer any **TWO** questions from this section.

Question 6 [25 marks]

A laboratory study was carried out in which bluegill fish were placed in large aquaria (tanks) and were allowed to forage in low plant cover plots or high plant cover plots. Later, a predator (bass fish) was introduced into the aquaria. The mean number of foraging choices which the bluegill fish made in the absence and presence of the predator are presented in Figure 4 below.

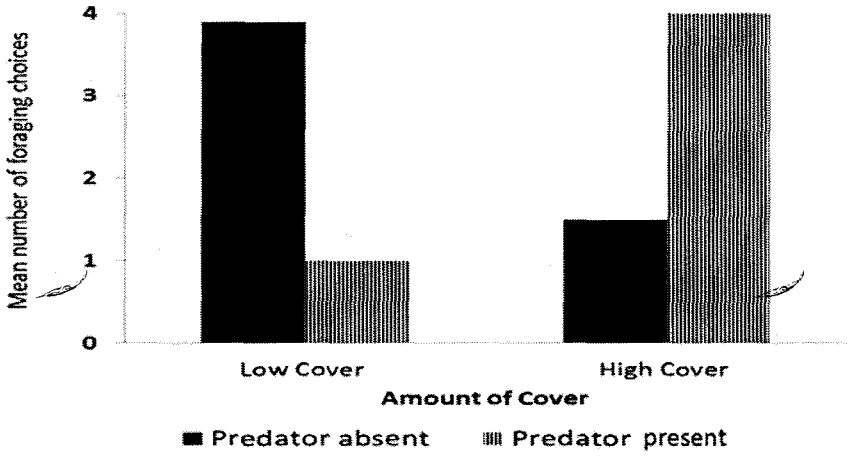

Figure 4. Mean numbers of foraging choices which the bluegill fish made in the absence and presence of the predator.

6.1 Describe trends that are revealed in Figure 4 regarding foraging choices. [4]

6.2 How would this foraging behaviour have developed in bluegill fish? [3]

6.3 Briefly discuss **THREE** models of optimal foraging theory. Each should be discussed in a separate paragraph. [15]

6.4 Briefly explain how this theory is applied in the example of foraging in the bluegill fish in Figure 4. [3]

Question 7 (25 marks)

7.1 "Predators and prey in a given ecosystem are involved in a long-term evolutionary arms race to survive". List **FIVE** anti-predatory strategies, with examples, that have evolved to support this observation. [10]

AND

7.2 Using a flow chart, illustrate the organisation of the vertebrate nervous system. For each part, annotate their main functions as bullet points. [15]

Question 8 (25 marks)

Monogamy is the behavioural pairing of a single male with a single female. However, this is not always the case. Discuss different mating systems in animals, especially endotherms; where mating has multiple partners. [25]

TOTAL MARKS

SECTION A = 50 MARKS
SECTION B = 50 MARKS
GRAND TOTAL = 100 MARKS

*** END OF EXAM ***