



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SUPPLEMENTARY EXAMINATION FOR  
BACHELOR OF SCIENCE IN BIOLOGY

SZL 409: ENVIRONMENTAL PHYSIOLOGY

DATE: 14/3/2022

TIME : 2:00 – 4:00 PM

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## INSTRUCTIONS

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

1.
  - a. Differentiate between Phenotypic plasticity and phenotypic flexibility (2 marks)
  - b. Outline the significance of hibernation in animals (2 marks)
  - c. Describe pseudoplacental viviparity (3 marks)
  - d. Explain the type of environment that is best for an ectotherm (3 marks)
  - e. Explain how birds have successfully managed in their environments without teeth (3 marks)
  - f. Describe three respiratory adaptations in diving mammals (3marks)
  - g. A student had the following samples for an ecophysiological study:

| Sample No. | Organism     |
|------------|--------------|
| A          | Lizard       |
| B          | Nile tilapia |
| C          | Camel        |
| D          | Shark        |

    - i. Outline the most likely nitrogenous compound in the excretory product of each (2 marks)
    - ii. Describe three osmotic adaptations of B (3 marks)
  - h. Explain the significance of of the evolution of the urea cycle in animals (3 marks)
  - i. Explain three physiological changes in an animal during diapause (3 Marks)

- j. Explain the significance of biological rhythms in animals (3 marks)

### SECTION B

2. Discuss:
- a. Advantages and disadvantages of an ectothermic lifestyle (10 marks)
  - b. Responses of a mammalian homeostatic control system when air temperatures are low (10 marks)
3. Discuss migration in animals (20 marks)
4. Explain how aquatic animals deal with the following challenges in their environment:
- a. Hypoxia (10 marks)
  - b. Reproductive challenges (10 marks)
5. Discuss the following in desert animals:
- a. Osmotic adaptations (10 marks)
  - b. Dietary adaptations (10 marks)