BINDURA UNIVERSITY OF SCIENCE EDUCATION
BIOLOGICAL SCIENCES DEPARTMENT
BScBZH/ HBScED/BScED/HBScBiotec
ANIMAL PHYSIOLOGY (BZH 205)

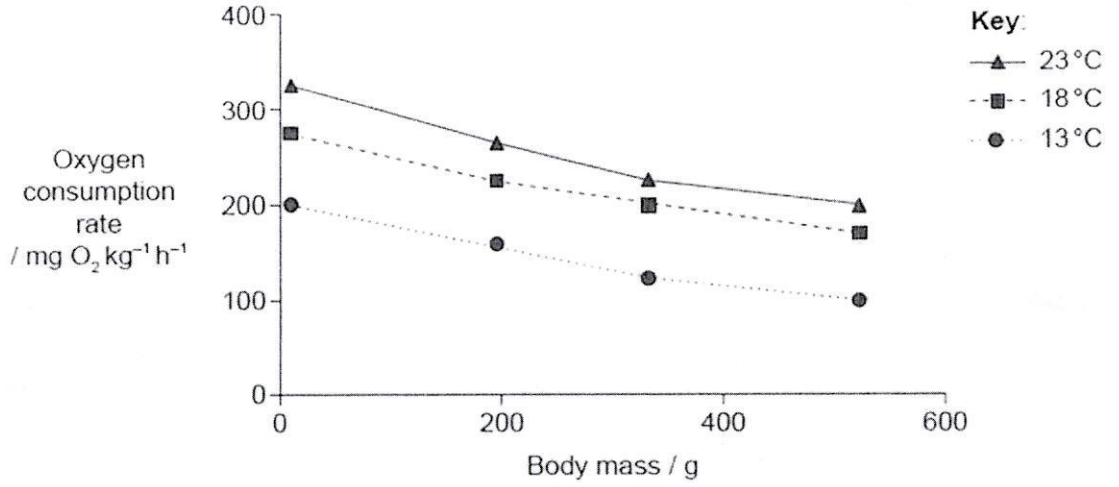
EXAMINATION
2 HOURS (100 marks)

AUG 2023

INSTRUCTIONS
Answer FOUR questions. You must answer question 1(Section A) and any other THREE questions from Section B. Each question carries 25 marks. Where a question contains subdivisions, the mark value of each subdivision is given in brackets. Illustrate your answer where appropriate with large clearly diagrams. You should not spend more than 30minutes on each question.

SECTION A (COMPULSORY)

1. The oxygen consumption rate of Tilapia fish Oreochromis niloticus was examined at three different water temperatures and at four different body masses. Figure 1 shows graphs drawn of the results of this experiment.



[Source: adapted from E Segovia, *et al.*, (2012), *Latin American Journal of Aquatic Research*, **40** (3), pages 766–773]

a) How is oxygen consumption rate determined? (6 marks)
(b) With reference to Figure 1 explain the relationship between
(i) body mass and the oxygen consumption of fish. (2 marks)
(ii) temperature and the oxygen consumption of fish. (2 marks)
(c) How can the knowledge of oxygen consumption rate be applied in fish aquaculture. (5 marks)
(d) Compare the mechanisms of gaseous exchange between birds and fish. (10 marks)

SECTION B

2.(a) Give a detailed account of the sliding filament mechanism of muscle contraction. (13 marks)

(b) Compare and contrast closed and open circulatory systems. (12 marks)

3. (a)Outline the major classes of hormones based on chemical structure. (5 marks)

(b) Describe the mechanisms of action of both steroid and protein hormones. (10 marks)

(c) Discuss the role of feedback loops in hormone control. (10 marks)

4. (a) Name the major functions of the lobes of the cerebrum. (10 marks)

(b) Compare the sympathetic and parasympathetic nervous systems. (15 marks)

5. (a) Compare the major byproducts of ammonia metabolism in fish, birds, insects, reptiles, and mammals. (15 marks)

(b) Explain the process of glomerular filtration in the kidneys. (10 marks)

6. Using suitable examples, discuss the adaptations in animals to harsh climate in both aquatic and terrestrial habitats.

END OF EXAMINATION QUESTION PAPER