



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
DEPARTMENT	FISHERIES AND OCEAN SCIENCES		
SUBJECT	ICHTHYOLOGY II		
SUBJECT CODE	F36310Y		
DATE	JUNE/JULY 2026		
DURATION	3 Hours	MARKS	100

FIRST OPPORTUNITY EXAMINATION

Examiner: Mr. M. Tjipute

Internal Moderator: Mr. L. Kandjengo

External Moderator: Prof. W. J. Luus-Powell

This question paper consists of [3] pages including the cover page

Instructions

Answer All the questions in Section A

Answer All the questions in Section B

Answer only One (1) question in Section C

Section A: Answer ALL the Questions.

1. Explain the function of the gall bladder in the digestive system. (2)
2. Oxygen concentration in water constitutes about 0.001%. Explain how fish adapted to the low concentration of oxygen in water. (4)
3. Catfish, *Clarias gariepinus*, and mudskipper, *Periophthalmus gracilis*, are two of fish species that adapted to hypoxic conditions through several physiological developments. Discuss two of such adaptations. (4)
4. Briefly outline the main differences (and explain why) in stomach and intestinal structures between herbivorous and carnivorous fishes. (10)
5. Homeostasis is a process that serves to maintain internal equilibrium in fish. Discuss this statement by referring to:
 - a) The role of the endocrine system and the autonomic nervous system in controlling physiological responses. (7)
 - b) The mechanisms involved in maintaining water, solids, and pH balance. (8)
6. The Figure 1 shows a theoretical relationship between Haemoglobin saturation and oxygen availability of Hake (*Merluccius capensis*) and Goby (*Sufflogobius bibarbatus*).

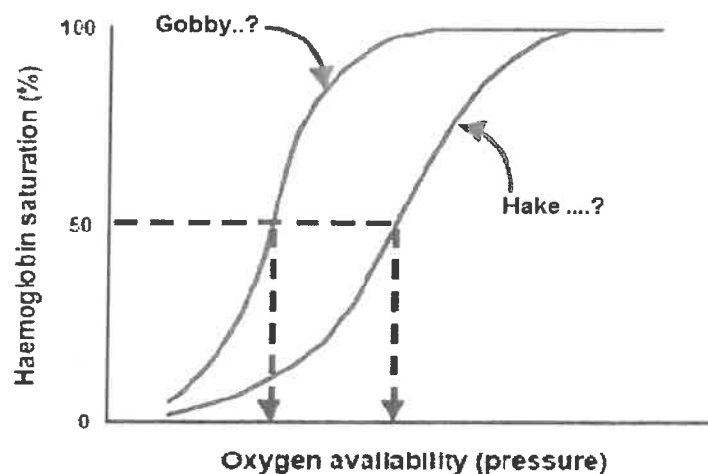


Figure 1: The relationship between Haemoglobin saturation and oxygen availability of Hake (*Merluccius capensis*) and Goby (*Sufflogobius bibarbatus*).

- a) Use Figure 1 to explain what oxygen affinity and the Bohr effect is. (10)

[Subtotal 45]

Section B. Answer ALL the Questions

7. Discuss the gas exchanges in embryonic and larval fish (5)
8. Describe the physoclistous type of swim/gas bladders. Also, explain the processes of gas inflation and deflation. (10)
9. You have been appointed as a laboratory demonstrator for learners at Kamwandi Junior Secondary School. Describe how you would conduct and demonstrate a fish dissection during a laboratory practical session. (10)
10. A research project looking at the reproductive biology of Silver Kob, *Argyrosomus inodorus*, produced the following data (Table 1) during the 2025 sampling. (15)

Table 1. Data of the reproductive biology of Silver Kob, *Argyrosomus inodorus*

Month	Average Body weight, g	Average Gonad weigh, g
January	102	16.08
February	987	15.32
March	989	16.8
April	799	18.7
May	105	16.7
June	1150	19.05
July	998	25.45
August	990	27.83
September	958	30.48
October	889	16.55
November	117	13.09

a) Calculate the Average Gonado-somatic index of the species throughout the year and depict it graphically. (12)

b) Indicate the spawning period of the species. (3)

[Subtotal 40]

Section C. Answer One Question Only

11. Provide an analytical discussion on the morphologic and physiologic adaptation of fish in terms of blood circulation and the advantages of such adaptive changes. (15)

12. Provide a comparative analysis of morphological and physiologic adaptation of freshwater and marine fish osmoregulation. (15)

13. Analytically discuss the morphologic and physiologic adaptation of fish central nervous system with specific relations to brain development, sensory adaptation, and relation to behaviour. (15)

[Subtotal 15]

TOTAL MARKS = 100

END OF EXAMINATION