



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	AGRICULTURE AND FISHERIES SCIENCES		
DEPARTMENT	FISHERIES AND OCEAN SCIENCES		
SUBJECT	FISH PATHOLOGY		
SUBJECT CODE	FAS3831		
DATE	JUNE 2026		
DURATION	3 Hours	MARKS	100

REGULAR EXAMINATION

Examiner: Mr. M. Tjipute

Internal Moderator: Mr. L. Kandjengo

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

This marking scheme paper consists of [4] 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. Define the following concepts: (8)
 - a. Prevalence
 - b. Horizontal transmission
 - c. Phagocytosis
 - d. Epidemic
2. Name and discuss any 2 factors affecting immune response in fish. (8)
3. Name the causative agent for "Ich or White spot" disease. How can it be treated? (3)
4. Describe the clinical signs of Viral Haemorrhagic Scepticemia at the acute phase. (3)
5. What are the pathological conditions associated with: (4)
 - a) excessive COH intake
 - b) low iron (Fe) intake
 - c) deficiency in tryptophan
 - d) protein deficiency
6. List the four causes of infectious diseases (4)

[30 marks]

Section B. Answer ALL Questions

7. A group of fish is to be anaesthetized using ethyl *p*-aminobenzoate (benzocaine). Using a stock solution of 10% benzocaine in 70% alcohol (30 ml distilled water, 70 ml alcohol + 10 g benzocaine). What volume should be added to achieve 20 mg per litre benzocaine in a tank containing 40 litres of water? (5)

8. You are treating *Oreochromis andersonii*, infected with *Ichthyophthirius multifiliis*, in 50 L- buckets, and you need a NaCl treatment dosage of 1 mg/l. You have a 20-ml beaker for dosing the chemical. What strength of solution do you need to give the correct dosage, using one beaker full for every bucket? (5)
9. *Oreochromis niloticus* (hybrid) at Eco-Fish Farm, Hardap Dam, has been diagnosed with a bacterial disease "Columnaris". Advice on the therapy to be undertaken. (5)
10. Pure oxytetracycline is to be used to treat 50 kg of fish at a dose rate of 75 mg active ingredient per kg of fish per day at daily feed rate of 0.75% per day for seven (7) days. How much antibiotic (oxytetracycline) should be added to how much feed? (5)
11. *Herpesvirus ictaluri* is responsible for causing CCVD. Explain its step-by-step invasion. (5)
12. Explain the functions of the B cells, Killer T-cells, Memory T-cells and Neutrophils in the immune response of fish? (5)
13. List the external barriers that can be applied as part of Biosecurity measures to prevent the spread of disease organisms onto and off a fish farm. (10)
14. Identify the parasite in figure 1, below. Also indicate site of infestation, the clinical signs as well as treatment and control measures. (10)



Figure 1.

[50 marks]

Section C: Answer ONE question only

15. Explain the relationship between Host, Environment and Pathogen in the outbreak of disease in fish. (20)
16. Name and discuss 5 factors of disease control in aquaculture. (20)

[20 marks]

TOTAL: 100 Marks

END OF EXAMINATION