



UNIVERSITY OF RUHUNA
FACULTY OF FISHERIES AND MARINE SCIENCES & TECHNOLOGY
Academic Year 2022/2023

**Bachelor of Science Honours in Fisheries and Marine Sciences Degree/
Bachelor of Science Honours in Marine and Freshwater Sciences Degree**

Level I Semester II Examinations Apr/May 2024

FAQ 1222: Fundamentals of fish genetics

Time: 1 hour and 30 minutes

Answer question 1 and any two (02) other questions only

1. i. Define the following terms

- a. gene
- b. phenotype
- c. allele
- d. pure line
- e. test cross

(25 marks)

ii. Black, bronze, and gold are the body colours of Mozambique tilapia (*Oreochromis mossambicus*). The following table shows the summary record of breeding experiments.

Male	Female	Offspring
Black	Black	100 % Black
Black	Bronze	50 % Black; 50 % Bronze
Gold	Gold	100 % Gold
Gold	Bronze	50 % Gold; 50 % Bronze
Gold	Black	100 % Bronze
Bronze	Bronze	25% Black: 50% Bronze: 25% Gold

a. Explain the inheritance pattern of body colors in Mozambique tilapia.

(40 marks)

b. A farmer wanted to produce only bronze tilapia in his farm and decided to cull (remove from the farm) all the black and gold coloured tilapia. Do you agree with the farmer's decision? Explain reasons for your answer.

(25 marks)

c. What is your recommendation for the farmer to produce only bronze tilapia?

(10 marks)



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FAQ 3112: B

2. i. Define the following terms and describe the difference between each pair.

- Dominance and epistasis
- Incomplete dominance and co-dominance
- Sex limited traits and sex influenced factors
- Pleiotropic effects and polygenic traits

(80 marks)

ii. Eye color in Mexican cave characins is controlled by an **X-linked** gene. Fish homozygous for allele "A" have yellow eyes; those homozygous for allele "a" have black eyes, and heterozygotes have brown eyes. What is the probability to have a brown eye male from a mating of a yellow eye male and a black eye female? Explain your answer.

(20 marks)

1. (a) W

(b) W

(c) P
n

(d) I

(e)

(f)

(g)

(h)

2. (

3. "Gene interaction modifies the typical dihybrid ratio of 9:3:3:1 and reduces the number of phenotypes." Giving suitable examples from aquaculture/fish traits, briefly explain this statement.

(100 marks)

4. Write short notes on **any four (04)** of the following.

- Mendel's experiments with garden pea plants
- Lethal genes
- Multiple alleles
- Pedigree analysis
- Inheritance of X-linked recessive traits

(100 marks)

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