

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, MAY 2024

THIRD YEAR [BATCH 2021-24]

ZOOLOGY [HONOURS]

Paper : DSE 3

Date : 17/05/2024

Time : 11 am – 1 pm

Full Marks : 50

1. Answer **any five** questions : [5×2]
- i) Define 'food conversion rate' and 'conversion efficiency' with respect to fish feeding. (1+1)
 - ii) Which immunoglobulins are observed in teleost and cartilaginous fishes?
 - iii) What is the primary purpose of a biological filter in an aquarium? Give an example. (1+1)
 - iv) What are epilimnion and hypolimnion?
 - v) Briefly describe the various advantages of using Zebrafish as an experimental model organism.
 - vi) How do high BOD and COD levels affect aquatic organisms and overall water quality?
 - vii) What does the term "Livebearer" refer to in aquarium fish keeping? Give an example. (1+1)
 - viii) What is isinglass? Mention its uses. (1+1)

Answer **any four** questions : [4×10]

2. a) Describe briefly how Zebrafish can be used as a model organism in cardiovascular and cancer research.
b) How does shellfish culture differ from finfish aquaculture in terms of techniques and requirements? (5+5)
3. a) Discuss a suitable mathematical model of environmental risk assessment in the context of genetically modified (GM) fish.
b) What are some methods used to reduce BOD and COD levels in polluted water bodies?
c) Describe hypothetically an experimental design applying suitable molecular biology techniques to study the function of a gene product by gene silencing in Zebrafish during its development. (4+2+4)
4. a) Discuss about the importance of 'Quarantine tank' in aquarium fish keeping.
b) Name two diseases of fish caused by bacteria and fungi respectively.
c) Write a short note on aquaria food and feeding.
d) What is neritic zone?
e) Name two ornamental fishes suitable for small aquarium? [2+2+2+2+2]
5. a) Name one aquarium ornamental fish which is also used for mosquito control. Give one example of a 'nest builder' ornamental fish species.
b) Write about sexual dimorphism in gold fishes.
c) What is EEZ?
d) Write some major characteristics of EEZ.
e) Classify the zonation of a lake on the basis of penetration of light. [(1+1)+3+1+2+2]
6. a) How can you estimate L_{∞} using the Gulland and Holt method? In which condition is this method applied?
b) Explain the term 'immunomodulation' in fish with proper reference to Glueans and probiotics.
c) State the causative agent, symptoms and treatment procedure for white spot disease. [(2+1)+4+(1+1+1)]

7. a) Formulate a fish diet containing 35% protein using the following mixture:
Fish meal - 60% protein, Soybean - 45% protein, Rice bran - 8% protein, Corn meal - 12% protein
Assume the proportion of 1 part fish meal to 2 parts soybean and equal parts of rice bran and corn meal.
- b) Discuss the role of important lymphoid organs involved in fish immunity.
- c) Briefly discuss the process of 'liming' along with its importance in aquaculture. (5+2+3)
8. a) What is composite fish culture? Explain with examples.
- b) Write a short note on pre-stocking management in composite fish culture.
- c) Describe the strategies used in pen and cage culture. [2+4+(2+2)]
9. a) Write a short note on sex reversal in *Tilapia*. What is induced breeding? Explain with an example.
- b) What do you mean by salting and canning of food?
- c) Discuss the various fisheries law and regulations implemented in India. [(3+2)+(1.5+1.5)+2]

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