

**Chattogram Veterinary and Animal Sciences University, Chattogram**  
**Faculty of Fisheries**

**B. Sc. Fisheries (Hons.) Year -04, Semester-02 (July-December), Final Examination' 2023**

**Course No: FIL-402 (T), Course Title: Fish Inspection and Legislation (Theory)**

**Total Marks: 70**

**Time: 3 hours**

Answer any 5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.

**Section-A**

1. a) What are the major issues and challenges in seafood industry? 2.0  
b) Write in brief about general considerations need to take during auditing processing establishment. 2.0  
c) Describe different types of verification practiced in Bangladesh. 3.0
2. a) Write in brief the substance groups that are monitored under NRCP program. 2.0  
b) What are the investigation measures taken in case of NRCP positive results? 2.0  
c) What should be the sampling strategy according to policy guidelines for NRCP? 3.0
3. a) Describe the requirements of a newly established fish processing plant for getting approval. 3.0  
b) State briefly the sampling plan and microbiological limit for fish and fish products (ICMSF-1986). 4.0
4. a) Explain briefly as per FIQC rule-7, what kind of measures need to be taken when non-compliant consignment of fishery products returns to Bangladesh after rejection from importing country. 3.0  
b) Briefly discuss main features of Fish Hatchery Act, 2010. 4.0
5. a) Differentiate between food infection and food intoxication with examples. 1.5  
b) Name some spore forming and non-spore forming bacteria usually contaminated in seafood. 2.5  
c) Explain briefly some control measures for pathogenic bacteria in processing of fishery products. 3.0
6. a) Name what kind of different fishery establishments in Bangladesh which needs listing/registration for official control. 3.0  
b) Define "Official Control of Fish and Fishery Products". Choose the documents required in getting approval from the Competent Authority for a newly established fish processing establishment in Bangladesh. 4.0
7. a) Show the organogram of FIQC. 4.0  
b) Briefly describe the framework of recommended paper-based traceability system used for shrimp value chain in Bangladesh. 3.0

**Section-B**

8. a) How an inspector will report after completing audit in a processing establishment? 2.0  
b) What are the major activities for an inspector during inspection of a pre-export consignment? 2.0  
c) Explain the components of traceability system of shrimp value chain. 3.0
9. a) Briefly discuss some important aspects need to follow for compliance of official control for fish and shrimp. 4.0  
b) Prepare a checklist for inspection of fish processing plant. 3.0
10. a) Enumerate the major inspection activities of FIQC. 3.0  
b) ~~Illustrate the organogram of FIQC.~~ Write short note on NRCP. 4.0
11. a) What would be the penalty if anyone commits any crime under Fish Feed and Animal Feed Act, 2010? 2.0  
b) Explain briefly regulation (EC) No. 853/2004. 3.0  
c) Who will be an authorized officer for official control of fishery products in the processing establishment as per FIQC rule-3? 2.0
12. a) Prepare a checklist for auditing the performance of a feed industry. 3.0  
b) Mention the names of some movement documents used by the different stakeholders for marinating traceability of shrimp value chain in Bangladesh. 4.0
13. a) ~~State briefly the sampling plan and microbiological limit for fish and fish products (ICMSF-1986).~~ Discuss the sampling protocol for fish and fishery products. 4.0  
b) Prepare a checklist for inspection of fish and shrimp farms. 3.0
14. Write notes on the followings (any two): 3.5 × 2 = 7.0  
a) Major food safety problems faced by the fishery industries of Bangladesh; (b) Hatchery Act and rules  
c) Importance of Fish Inspection and Legislation course; (d) RASFF notification.

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**Faculty of Fisheries**

**B. Sc. Fisheries (Hons.) Year -04, Semester-02 (July-December), Final Examination' 2023**

**Course No: FFT-402 (T), Course Title: Fish Feed Technology (Theory)**

**Total Marks: 70                      Time: 3 hours**

Answer any5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section

**Section-A**

1. a) Briefly describe different types of feed available for aquaculture in Bangladesh. 3  
b) What are the factors need to be considered in selecting aqua feed for feed formulation? 4  
Explain in details.
2. a) Mention the importance of diet preparation in aquaculture. 2  
b) Why feeding rate and frequency are important for the successful feed management in aquaculture? 3  
c) Illustrate the advantages and disadvantages of formulated aqua feeds used in Bangladesh. 2
3. a) Classify the major ingredients based on nutritional point of view. 3  
b) List down the conventional and non-conventional feedstuffs available for feed formulation in Bangladesh. 4
4. a) Distinguish between conventional and non-conventional feedstuffs in aquaculture. 1  
b) Briefly describe different methods for feed evaluation. 2  
c) Define Pearson Square method and how to apply it in feed formulation. 4
5. a) What do you know about non-nutritional components of diet? 2  
b) The Juvenile Sea bass with an initial average weight of 11.52 g was stocked in a recirculatory aquaculture system for 90 days. At harvest, the average weight of fish becomes 53.44 g. During the culture period, the average feed intake was 84.37 g. It is assumed that there was no mortality. The supplied feed contains 11% moisture and 40% protein. Calculate the i) Percent weight gain, ii) Specific growth rate, iii) Feed conversion ratio, and iv) Protein efficiency ratio. 5
6. a) Differentiate between apparent and true nutrient digestibility. 2  
b) What do you know about feed digestibility? Write down the factors affect the digestibility in fish. 5
7. Write short note on any **two (02)** of the following: 3.5 × 2 = 7  
a) Least-cost feed formulation, b) Medicated feed, and c) Best-buy method feed formulation

**Section-B**

8. a) Define antioxidant. Name the type of antioxidants used in aquafeed industries. 3  
b) Explain in details the effect of antioxidants in fish feed. 3  
c) Write down the advantages of antioxidant enrichment in feed. 1
9. a) Briefly describe the different stages of fish feed manufacturing process. 4  
b) Write down different types of quality losses that are occurred in feed during storage. 3
10. a) What are the by-products of soya bean derive during processing? 2  
b) Describe the effects of feed ration, feeding frequency, and feeding period on growth and survival of *Ompok pabda* and *Macrobrachium rosenbergii*. 5
11. a) Summarize the basic guidelines need to follow for operating a commercial feed mill. 3  
b) Draw a schematic diagram of a feed mill and show the main components. 4
12. a) Define feed storage. Explain in details the importance of storage of aqua-feed. 4  
b) Write down the general guidelines for storage of aqua-feed. 3
13. a) Illustrate different steps of food intake by fish. 3  
b) Explain in details the factors influencing food intake in fish. 4
14. Write short note on any **two (02)** of the following: 3.5 × 2 = 7  
a) Microencapsulated diet, b) Probiotics, and c) Protease inhibitors

# Chattogram Veterinary and Animal Sciences University, Chattogram

## Faculty of Fisheries

**B. Sc. Fisheries (Hons.) Year -04, Semester-02 (July-December), Final Examination' 2023**  
**Course No: BHM-402 (T), Course Title: Fish Breeding and Hatchery Management (Theory)**

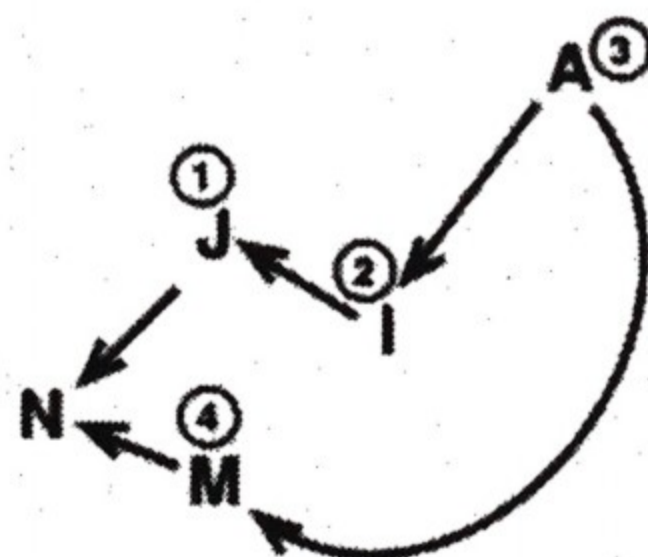
**Total Marks: 70**

**Time: 3 hours**

Answer any 5 (five) questions from each section. Illustrate your answer wherever necessary. Figures in the right margin indicate full marks. Use separate answer script for each section.

### Section-A

1. a) What do you understand by hatchery, breeding and hatchery management? 3  
b) Discuss the key challenges currently faced by fish hatcheries in Bangladesh and suggest possible solutions to overcome these issues. 4
2. a) What is fish seed? 1  
b) Explain the necessities of artificial breeding in Bangladesh. 3  
c) Synthetic inducing agent is more feasible than natural inducing agent for induced spawning in Bangladesh- explain your opinion. 3
3. a) "Brood is the heart of the hatchery"- explain. 2  
b) Suppose you want to initiate a new business for producing seed of an important freshwater fish. What are the criteria you will consider for the collection and stocking of broods for your hatchery? Describe in details. 5
4. a) Explain the term: embryo, hatchling, spawn, and fingerlings. 2  
b) "The first feed of larvae programmes the survival, metabolism and growth in fish"- Justify. 2  
c) What are the advantages and disadvantages of using live feed versus artificial feed for fish larvae? 3
5. a) What do you understand by tandem selection and selection index? 2  
b) Differentiate between within and between family selection. 2  
c) In a given population of Tilapia, the weight (gm) of the fishes was as follows- 3  
635, 624, 677, 676, 631, 645, 652, 619, 614, 610, 677, 692, 603, 646, 630, 624, 618, 614, 625, 645, 674, 605, 670, 690, 620, 628, 690, 634, 602, 698, 655, 691, 635, 609, 657, 691, 603, 649, 677, 692, 605, 656, 601, 695, 676, 690, 652, 600, 697, 643, 691, 624, 679, 660, 651, 639, 689, 607, 666, and 692gm.  
Select 12 fishes for disruptive selection program.
6. a) What is effective breeding number? Make a relationship between effective breeding number and inbreeding. 2  
b) Differentiate between inbreeding and gene introgression. 2  
c) Calculate the inbreeding from the following path for the population N where the common ancestor A had inbreeding value 1.14. 3



- 7 Write short note on any 02 (two) of the following: 3.5 × 2 = 7
  - a) Operational issues of hatchery management, b) Genetic drift and bottleneck, c) Phenotypic variance, d) Pedigreed mating

## Section-B

8. a) Explain the following terms: ovulation, oviposition, latency period and spawning. 2  
b) "Oozing is one of the important criteria for brood selection"- explain the statement. 2  
c) Do you think, seed production in Bangladesh can be increased by natural process? What are the measures can be taken to improve the natural seed production in Bangladesh? 3
9. a) Differentiate between the hatchery components of a fish hatchery and a prawn hatchery. 3  
b) What factors determine the choice between circular, vertical, and horizontal incubators? 2  
c) Discuss the special features of circular incubator with its merits and demerits. 2
10. a) What do you understand by "Bundh breeding"? 1  
b) Why the IMCs does not breed in captivity? 2  
c) When you will collect PG from fish for induced breeding and why? 2  
d) Nutritional programming can help in early onset or delay in spawning in fish outside the spawning season. Do you think so? Explain. 2
11. a) What do you mean by heritability? 1  
b) Enlist the major techniques for the calculation of heritability in fish. 2  
c) Suppose, a fish farmer decides to initiate a selection program for increased growth rate in the *Lates calcarifer*, which currently averages 3520g. To implements his program, the farmer selects 15 females that average wt. 3405g and 10 males that average wt. 3145g. If the additive genetic variance was 50% and the phenotypic variance was 90% for the given population, what will be the predicted average weight in the next generation? 4
12. a) "Inbreeding changes genotypic frequency"- explain. 2  
b) How does inbreeding depression manifest in fish, and what are its economic impacts? 2  
c) In a given population of *Labeo gonia*, the weight (gm) of the fishes was as follows. The underlined fishes are male and non-underlined fishes are female. 3  
1845, 1670, 1528, 1790, 1634, 1802, 1845, 1549, 1777, 1492, 1505, 1956, 1809, 1757, 1591,  
1689, 1705, 1770, 1690, 1820, 1530, 1724, 1587, 1659, 1798, 1655, 1591, 1735, 1710, 1812,  
1677, 1603, 1835, 2024, 1703, 1746, 1666, 1739, 1501, 1995, 1776, 1690, 1752, 1800, 1692,  
1616, 1814, 1725, 1698, 1912, 1803, 1349, 1407, 1240, 1589, 1660, 1430, 1350, 1980, 2045,  
1390, and 1597 gm.  
Calculate the inbreeding value from the above population.
13. a) Explain the term hybridization, recurrent selection and heterosis? 2  
b) Is it possible to successfully hybridize a carp fish with a snakehead fish? Why or why not? 2  
c) Suppose, a carp farmer decides to initiate a hybridization program using *Gibelion catla* (average weight 1590gm) and *Labeo calbasu* (average weight 1670gm). If the heterosis value is 12% from the population mean, what will be the hybrid offspring weight for that population? 3
14. Write short note on **any 02 (two)** of the following: 3.5 × 2 = 7  
a) Broodstock genetics, b) Factors influence the artificial breeding, c) No selection, d) Uses of inbreeding