

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

B.Sc. Fisheries (Hons.) Year 04, Semester 02 (July-December) Final Examination, 2021

**Course Code: FFT 402 (T), Course Title: Fish Feed Technology (Theory)**

Total Marks: 70      Time: 3 hours

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

**Section-A**

1. a) Discuss the importance of aquafeed in the aquaculture. 3  
b) Classify artificial feed based on the ingredient compositions. 4
2. a) Enlist the non-nutrient components of a formulated feed. 3  
b) Write down the major nutritional profile, deleterious constituents and recommended inclusion level of three major plant origin feedstuffs used in aquafeed. 4
3. a) What do you mean by antinutritional factors? 3  
b) Discuss briefly any two of the antinutritional factors available in oil seed derived ingredients. 4
4. a) Define feed formulation. Write down the objectives of feed formulation. 3  
b) Prepare a diet containing 36% crude protein (CP) for freshwater prawn (*Macrobrachium rosenbergii*) using the following ingredients: squid meal (78% CP), fish silage (55% CP), corn meal (12 % CP) and wheat flour (16% CP). 4
5. a) Why feeding rate and frequency are important for the successful feed management in aquaculture? 2  
b) Discuss different types of non-demand feeders used in aquafarm. 5
6. a) What is feed manufacturing? 3  
b) Briefly discuss the basic steps of aqua feed manufacturing process. 4
7. Write short notes on any two of the following: 3.5x2=7  
a) Meat by-product meals; b) Poultry by-products and c) Probiotics

**Section B**

8. a) Explain in details the different types of feed available in Bangladesh for aquaculture organisms. 3  
b) Illustrate the advantages and disadvantages of formulated feeds used in Bangladesh. 4
9. a) Explain in details the general consideration needs to follow in formulating practical diet. 3  
b) Classify the major ingredients based on nutritional point of view. 4
10. a) Define digestibility? Write down the factors affecting digestibility. 3  
b) Differentiate between apparent and true nutrient digestibility. 4
11. a) Illustrate different steps of food intake by fish. 3  
b) Explain in details the factors influencing food intake in fish. 4
12. a) Describe different methods for feed evaluation. 4  
b) Write down the different types of quality losses that are occurred in fish during storage? 3
13. a) Define feed storage? Explain in details the importance of storage of aqua-feed. 3  
b) Write down the general guidelines for storage of aqua-feed. 4
14. Write short notes on any two of the following: 3.5x2=7  
a) Least-cost feed formulation; b) Best-buy feed formulation and c) Microencapsulated diet

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

B. Sc. Fisheries (Hons.) Year -04, Semester-02 (July-December) Final Examination' 2021  
Course Code: **BHM-402 (T)**, Course Title: **Fish Breeding and Hatchery Management (Theory)**  
Total Marks: 70                      Time: 3 hours

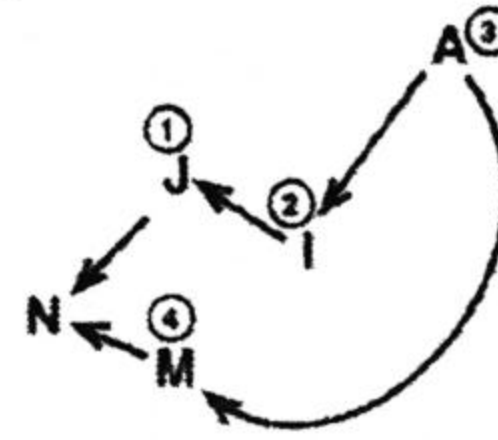
Answer any 5 (five) questions from each section from the followings. Illustrate your answer wherever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.

**Section-A**

1. a) Explain the role of hatchery to meet the requirements of fish seed for aquaculture. 4  
b) As a hatchery manager which type of hatchery you will choose for carp breeding program? - 3  
justify your answer with proper explanation.
2. a) Write down the causes of mortality during fish seed transportation. What do you understand 2  
about conditioning of fish/larvae?  
b) Conditioning can reduce the mortality of fish seed during transportation- Justify your answer. 2  
c) Outline the process of conditioning which are commonly used in fish farm or hatchery. 3
3. a) Define the following terms: fertilization, ovulation, latency period and larva. 2  
b) Schematically show the preparation of pituitary gland extract. 3  
c) Synthetic inducing agent is more feasible than natural inducing agent for induced spawning in 2  
Bangladesh- give your opinion.
4. a) Summarize the effect of inbreeding in a fish farm. 2  
b) Establish a relationship between inbreeding and effective breeding number. 2  
c) In a given population of *Labeo bata*, the weight (gm) of the fishes was as follows. The underlined 3  
fishes are male and non-underlined fishes are female.  
845, 549, 777, 492, 505, 956, 501, 655, 591, 735, 995, 776, 814, 725, 845, 670, 528, 809, 757,  
591, 705, 770, 690, 820, 530, 724, 587, 659, 798, 689, 710, 812, 677, 603, 835, 1024, 703,  
746, 666, 739, 790, 634, 802, 698 and 592 gm.  
Calculate the Ne from the above population.
5. a) What do you understand by the term embryo, hatchling, fry and fingerlings. 2  
b) How live food influence the growth and survival of larvae during rearing? 2  
c) Explain how feeding frequency and feed particle size influence the growth and survival of 3  
larvae during rearing.
6. a) What is heterosis? How can you measure heterosis? 2  
b) "Hybridization does not produce good brood stock"- explain. 2  
c) Suppose, a fish farmer decides to initiate a selection program for increased growth rate in the 3  
*Mystus gulio*, which currently averages 330 g. To implements his program, the farmer selects  
80 females that average wt. 406 g and 75 males that average wt. 370g. The additive genetic  
variance was 40% and the phenotypic variance was 95% for the given population. What will  
be the predicted average weight in the next generation?
7. Write short notes on any two of the following: 3.5 × 2 = 7  
a) Recurrent selection, b) Waste water treatment, c) Control of spawning, and d) History of artificial  
fish seed production

**Section-B**

8. a) Point out the key criteria for the selection of a quality brood. 2  
 b) Differentiate between induced and natural fish breeding. 2  
 c) "Collection of pituitary gland depends on the time of day"- explain the statement with example. 3
9. a) What do you know about anaesthesia? Name three commonly used anaesthetic agent in fish transportation. 2  
 b) Justify the importance of using anaesthesia during fish transportation. 2  
 c) Evaluate the traditional live fish transport system as a hatchery manager. 3
10. a) Why quantitative phenotype exhibits continuous variation? 2  
 b) Why  $V_D$  cannot be inherited? 2  
 c) "Epistatic genetic variance is a mixture of heritable and non-heritable variance"- Explain. 3
11. a) What do you know about inbreeding and gene introgression? 2  
 b) Differentiate between inbreeding and hybridization. 2  
 c) Calculate the inbreeding from the following path for the population N where the common ancestor (A) has inbreeding value was 2.07. 3



12. a) Define hybrid, hybrid vigor and hybridization. 2  
 b) Explain the statement "The result of hybridization is unpredictable". 2  
 c) Suppose, a carp farmer decides to initiate a hybridization program using *Gibelion catla* (average weight 1570 gm) and *Labeo calbasu* (average weight 1750gm). The farmer found average offspring weight 1630 gm when mated with *Gibelion catla* male and *Labeo calbasu* female. The farmer also found average offspring weight 1670 gm when mated with *Gibelion catla* female and *Labeo calbasu* male. Calculate the heterosis for the breeding program. 3
13. a) Define selection and mention the its importance. 2  
 b) 'Sometimes no selection can be beneficial for a population than selection' – Explain. 2  
 c) In a given population of *Puntius sarana*, the weight (gm) of the fishes was as follows- 3  
 666, 739, 845, 603, 800, 698, 770, 690, 820, 530, 724, 616, 659, 591, 528, 790, 505, 814, 725, 705, 670, 835, 1024, 587, 752, 776, 690, 692, 812, 677, 549, 777, 689, 710, 634, 802, 798, 655, 591, 735, 809, 757, 492, 956, 501, 995, 845, 703, 746, and 592gm.  
 Select 10 fishes for directional selection program.
14. Write short notes on any two of the following: 3.5 × 2 = 7  
 a) Operational management of fish hatchery, b) Role of probiotics in larval rearing, c) Site selection criteria of finfish hatchery, and d) Independent culling

# Chattogram Veterinary and Animal Sciences University, Chattogram

## Faculty of Fisheries

**B. Sc. Fisheries (Hons.), Year-04, Semester-02 (July-December), Final Examination' 2021**

Course Code: **FIL-402(T)**, Course Title: **Fish Inspection and Legislation (Theory)**

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

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

### Section-A

1. a) Explain briefly the major food safety issues in fish and fishery products. 1.5  
b) List down some groups of bacterial hazards. 1.5  
c) List down the name of some intentionally or unintentionally added chemicals/veterinary drugs in fish and fishery products. 4.0
2. a) Differentiate between food infection and food intoxication with examples 1.5  
b) What is the relevant background legislation of FIQC under which this authority is conferred for the production of Fish and Fishery Products? 2.5  
c) Explain briefly some control measures for pathogenic bacteria in processing of fishery products. 3
3. a) Name different fishery establishments in Bangladesh which need listing/registration for official control. 3  
b) Define "Official Control of Fish and Fishery Products. Describe briefly the mechanism for listing of newly established processing establishment in Bangladesh. 4
4. a) Define audit? Explain briefly about the full verification/audit of a newly established processing factory 4  
b) Explain briefly preparations needed for the auditors/inspectors before arriving at the fish processing establishment. 3
5. a) Why pre-export testing of fishery product is important? -Justify. 2  
b) Enumerate the major inspection activities of FIQC. 2  
c) Write down the organogram of FIQC. 3
6. a) "Traceability helps to uplift seafood business."- Do you agree with this statement? Justify your answer. 2  
b) Enumerate some movement documents which are used by stakeholders in fish supply chain for maintaining traceability records. 5
7. a) What are the objectives of NRCP? 2  
b) Write in brief the substance groups that are monitored under NRCP program. 2  
c) What should be the sampling strategy according to policy guidelines for NRCP? 3

### Section-B

8. a) Briefly describe the key points of GMP conditions of a fish processing industry. 4  
b) How an inspector will report after completing audit in a processing establishment? 3
9. a) Prepare a checklist for inspection of fish farms. 4  
b) Write in brief about general considerations during auditing processing establishment. 3
10. a) Write short note on "ISO 9000". 3  
b) Describe briefly the sample collection process for the purpose of microbiological testing in fish and fishery products. 4
11. a) Briefly discuss the sampling plan and microbiological limit for fish and fish products. 4  
b) Mention the inspection criteria for fresh and frozen products. 3

2. a) Define CCA, RCA and LCA. 3  
b) (c) In addition to the regulation, mention some policies and guidelines in place for official control of fishery products in Bangladesh.
3. a) State briefly the sampling plan and microbiological limit for fish and fish products (ICMSF- 1986). 4  
b) Prepare a checklist for inspection of fish farms. 3
4. Write short notes on **any two** of the following: 3.5x2=7  
a) Major concerned of food safety problems in Bangladesh;  
b) Hatchery Act and rules  
c) Shrimp supply chain of Bangladesh.  
d) RASFF notification