

# Chittagong Veterinary and Animal Sciences University, Chittagong

## Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -01, Semester-02 (July- December), Final Examination, 2015

Course Code: CAM-102(T), Course Title: Coastal Aquaculture and Mariculture

Full Marks: 70; Time: 3 hour

Answer any 05 (Five) questions from each section. The figures in the right margin indicate full mark. Use separate answer scripts for each section.

### Section-A

1. a. Define 'Coastal Aquaculture'. 1  
b. Differentiate between freshwater and coastal aquaculture. 1  
c. "Coastal Aquaculture plays an important role in the economy of Bangladesh"- justify your answer. 5
2. a. Write down the criteria of different shrimp culture systems. 2  
b. Point out the major problems of shrimp culture in the 'ghers' of Bangladesh. What is your recommendation for solution of these problems? 5
3. a. Why Sea bass is the most important aquaculture species in Bangladesh? 2  
b. What is the dramatic change in the life cycle of sea bass? 2  
c. Explain 'sea bass is a catadromous and euryhaline species'. 3
4. a. Mention the physiological aspects of eye ablation in shrimp. 2  
b. Write down the characteristics of different larval stages of *Penaeus monodon*. 5
5. a. Discuss the culture practice of lobster in cages. 5  
b. What is the potentiality of lobster culture in the coastal region of Bangladesh? 2
6. a. Describe the culture method of any one of seaweed with its advantages and disadvantages. 1  
b. Write down economic importance of seaweed in Bangladesh. 6
7. Write short note on any **TWO** of the followings: 3.5x2=7  
a. Mullet culture, b. BOD, c. Feasibility of scallop culture in Bangladesh

### Section-B

8. a. Write down scientific names of four seaweed species commonly available in the St. Martin coast. 2  
b. Describe the physicochemical characteristics for seaweed culture. 5
9. a. Enlist some edible oysters. 1  
b. Define veliger larvae. 1  
c. Discuss the prospects and constraints of pearl culture in Bangladesh. 5
10. a. What do you know about habitat and distribution of milkfish? 2  
b. Give an account on milkfish culture in Bangladesh. 5
11. a. What is mangrove? 1  
b. Mention three major characteristics of a mangrove forest. 2  
c. Why mangroves are considered as the heaven for coastal fisheries? 4
12. a. What is scallop? 2  
b. Describe the method of scallop culture. 5
13. a. What is *Artemia*? 1  
b. How *Artemia* cyst is formed in nature? 3  
c. Describe the method of *Artemia* hatching in the hatchery. 3
14. Write short note on any **TWO** of the followings: 3.5x2=7  
a. Crab marketing system, b. Mangrove conservation and restoration, c. Sea-ranching

**Chittagong Veterinary and Animal Sciences University, Chittagong**

**Faculty of Fisheries**

B. Sc. Fisheries (Hons.) Year -02 Semester-01 Final Examination' 2015

Course No: **SEB-201 (T)**, Course Title: **Fish Systematics & Evolutionary Biology**

Total Marks: 70, Time: 3 hours

Answer **5 (five)** questions from each section. The figures in the margin indicate full mark.

**Section-A**

1. a. Define fish systematics. 02  
b. Draw a relation of Fish systematics with other branches of biology. 02  
c. What are the applications of studying "Fish Systematics"? 03
2. a. Define survey. 02  
b. Write down the names of different fishery survey techniques. 02  
c. Differentiate between boat and canoe electrofishing survey. 03
3. a. Make a list of 10 (ten) commercially important fish species, 5 (five) mollusks and 5 (five) crustaceans available in Bangladesh. 04  
b. Illustrate the external morphology of freshwater prawn. 03
4. a. What is 'Zoological nomenclature'? 01  
b. Describe the 'Law of priority' in nomenclature. 04  
c. Differentiate synonymy from homonymy. 02
5. a. What do you mean by 'Mutation theory'? 02  
b. Briefly describe the Darwinism theory with diagram. 05
6. Describe various species concept in details. 07
7. Write short note on **(any two)** from the following: 3.5×2=07  
a. Genus-group types  
b. Neo-darwinism  
c. Lateral line as taxonomic character

**Section B**

8. a. What do you mean by morphometric and meristic characters? 03  
b. Differentiate between taxonomy and systematics. 02  
c. What do you mean by race and variety? 02
9. a. Define taxonomy. 01  
b. Mention the taxonomic characters observed in fish. 04  
c. What are the requirements for taxonomic characters? 02
10. a. Describe how fins and rays help in making classification? 04  
b. Describe the patterns of evolution in fish. 03
11. a. What do you mean by hydroacoustics? 02  
b. Write down the advantage of hydroacoustics. 02  
c. Briefly describe the effects of survey activities. 03
12. a. What are the facts about population in evolution natural selection? 03  
b. What are the outcomes of evolution? 02  
c. Define organic evolution with example. 02
13. a. Define evolutionary and phylogenetic species. 02  
b. What are the patterns of speciation? 04  
c. Write down the importance of species in biological classification. 01
14. Write short note on **(any two)** from the following: 3.5×2=07  
a. Linnaean hierarchy  
b. Homonymy  
c. Type method

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**Faculty of Fisheries**

B. Sc. Fisheries (Hons.) Year -02 Semester-01 Final Examination' 2015

Course No: **FNU-201 (T)**, Course Title: **Fish Nutrition**

Total Marks: 70, Time: 3 hour

Answer any **5 (five)** questions from each section. The figures in the right margin indicate full mark.

**Section-A**

1. a. Define food and nutrition. 2  
b. How do you estimate the quality of food in chemical aspects? 5
2. a. What is carbohydrate? 1  
b. Write down the functions of carbohydrates. 3  
c. Enumerate the pathway of carbohydrate metabolism. 3
3. a. Describe the factors responsible for the fatty acid composition of fish. 4  
b. Write down the EFA deficiency signs in fishes. 3
4. a. Mention the required level of each essential amino acid in fish feed. 2  
b. Briefly discuss about amino acid metabolism. 2  
c. How the absorbed amino acids used up by fish? 3
5. Describe the dose-response curve used to determine quantitative amino acid requirement in fish. 7
6. a. Define digestion and absorption. 2  
b. Draw and label the typical digestive systems of carnivore, omnivore and planktivore fishes. 3  
c. Write down the factors affecting rate of digestion in fishes. 2
7. Write short notes on any 2 (two) of the followings: 3.5X2=7
  - a. Avitaminosis and hypervitaminosis
  - b. Energy balance equation
  - c. Crude fibre
  - d. SGR

**Section-B**

8. a. Define and classify vitamins with their internationally approved names. 2  
b. Write down the functions of one fat soluble and one water soluble vitamins. 2  
c. Mention the vitamin deficiency syndromes in fishes. 3
9. a. Differentiate between digestive fluids and enzymes. 1  
b. List the digestive fluids and enzymes secreted in teleosts with their functions in a tabular form. 6
10. a. Differentiate between apparent nutrient digestibility and true nutrient digestibility. 2  
b. Describe the indirect method of digestibility estimation. 5
11. a. Write the energy balance equation using standard quotation and explain it. 5  
b. What are the uses of this energy balance equation in aquaculture? 2
12. a. Differentiate any 3 (three) of the following pairs of terms: 6  
(i) FCR and FCE, (ii) Digestible energy and metabolizable energy,  
(iii) Crude protein and true protein, (iv) Nutrition and malnutrition.  
b. What are the limitations of dose-response curve? 1
13. a. What do you mean by broodstock nutrition? 2  
b. Describe the effects of dietary nutrients on reproductive output of fishes. 5
14. Write down short note on any 2 (two) of the followings: 3.5X2=7
  - a. Phospholipids
  - b. Essential fatty acids
  - c. Lipid peroxidation
  - d. Protein-energy ratio



**Chittagong Veterinary and Animal Sciences University, Chittagong**  
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B. Sc. Fisheries (Hons.) Year -02 Semester-01 Final Examination' 2015

Course No: **BIL-201 (T)**, Course Title: **Biological Limnology**

Total Marks: 70, Time: 3 hour

*Answer any 5 (five) questions from each section. The figures in the right margin indicate full mark.*

**Section-A**

- |    |    |                                                                                   |   |
|----|----|-----------------------------------------------------------------------------------|---|
| 1. | a. | What do you mean by biological limnology?                                         | 1 |
|    | b. | Why does limnological knowledge essential in fisheries sector?                    | 3 |
|    | c. | What are the causal factors of biological productivity of inland waters?          | 3 |
| 2. | a. | What do you mean by biogeochemical cycle?                                         | 1 |
|    | b. | Classify biogeochemical cycle.                                                    | 2 |
|    | c. | Briefly describe nitrogen cycle in aquatic waterbody.                             | 4 |
| 3. | a. | Define primary productivity and phytoplankton.                                    | 2 |
|    | b. | Briefly describe the factors affecting primary production in aquatic environment. | 5 |
| 4. | a. | Draw the anatomical features of Rotifer.                                          | 2 |
|    | b. | Define periphyton and benthos. Write down its significance in aquaculture.        | 5 |
| 5. | a. | Define eutrophication and algal blooms.                                           | 2 |
|    | b. | Briefly describe the effects and control measures of eutrophication.              | 5 |
| 6. | a. | Classify zooplankton based on their relative length of planktonic life.           | 1 |
|    | b. | Write down the feeding habits of different zooplankton.                           | 2 |
|    | c. | Write down the reproduction of Copepods.                                          | 4 |
| 7. | a. | Classify river based on age.                                                      | 2 |
|    | b. | Briefly describe the largest and longest river of the world.                      | 5 |

**Section-B**

- |     |    |                                                                                                                            |   |
|-----|----|----------------------------------------------------------------------------------------------------------------------------|---|
| 8.  | a. | What are the differences between limnology and oceanography?                                                               | 1 |
|     | b. | What do you mean by haor, baor and beel?                                                                                   | 2 |
|     | c. | Write down the major processes of the origin of lake and pond basin.                                                       | 4 |
| 9.  | a. | Why does primary productivity essential to life?                                                                           | 2 |
|     | b. | Briefly describe the Light-Dark method in determination of primary productivity.                                           | 5 |
| 10. | a. | Define zooplankton.                                                                                                        | 1 |
|     | b. | Briefly describe the main identifying characters of Rotifer, Cladocerans and Copepods.                                     | 6 |
| 11. | a. | Write down the nitrogen fixation methods in nitrogen cycle.                                                                | 2 |
|     | b. | Briefly describe phosphorus cycle in aquatic waterbody.                                                                    | 5 |
| 12. | a. | Draw the major river systems in Bangladesh.                                                                                | 2 |
|     | b. | Write down the source and course of the following rivers:<br>i. Padma; ii. Meghna; iii. Jamuna; iv. Karnafuli; v. Surma.   | 5 |
| 13. | a. | Write down the anatomical features of Cladoceran zooplankton.                                                              | 2 |
|     | b. | Classify Copepods and write down the differences among them.                                                               | 5 |
| 14. | a. | Write down the <sup>importance of nutrients for aquaculture,</sup> <del>nitrogen fixation methods in nitrogen cycle.</del> | 2 |
|     | b. | Why does Halda river so important in the fisheries sector of Bangladesh?                                                   | 5 |

**Chittagong Veterinary and Animal Sciences University, Chittagong**  
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B. Sc. Fisheries (Hons.) Year -02 Semester-01 Final Examination' 2015

Course No: STA-201 (T), Course Title: **Statistics**

Total Marks: 70, Time: 3 hours

Answer 5 (five) questions from each section. The figures in the margin indicate full mark.

**Section A**

1. a. Define variable. What are the types of variable? Explain with an example each. 03
- b. State the measurement scale of the following variable: Yearly salary of an employee in a fish processing plant, Age of seabass, Weight of shrimp, Efficiency of worker in fishery ghat 02
- c. Name two graphs used to display qualitative data. 02
2. a. What are the measures of dispersion? 04
- b. The following are some of the particulars of the distribution of weights of fishes of 'Khulshi Mart' and 'Agora' 03

	Khulshi Mart'	'Agora'
Number	65	35
Mean weight	4 kg	2kg
Standard deviation	0.5 kg	0.25 kg

The weights of which distribution is homogeneous? If you like to buy fishes, from which shop will you prefer?

3. a. Derive the formula to test the difference between two population means when, 03
  - i)  $n_1=10, n_2=15, \sigma=0.25$  Z
  - ii)  $n_1=35, n_2=30, s=0.36$  t
- b. The authority of 'Karnafuli' market claims that the selling price of their Tilapia is 200tk per kg. Consumer's Association of Bangladesh (CAB) wants to clarify their price using statistical procedure. A random sample of the selling prices of 100 fishes was collected and the average price per kg was found 205tk. Can CAB conclude at 5% level of significance that the average price is standard? Apply  $z_{\alpha/2} = 1.96$ . 04

4. a. Define simple linear regression with example. 03
- b. The following data gives the weight and market value of fishes unloaded from a trawler in fishery ghat. 04

Weight (in Kg)	6	5	1	3	4
Market value (in tk)	45	40	15	30	35

Fit the regression equation of market value on weight of fishes.

5. a. Define treatment and block with examples. Name the principles of experiment. 03
- b. Define CRD with an example. Compare between CRD and RBD. When we should use RBD instead of CRD? 04

6. a. Define contingency table. How does it differ from correlation table? Mention some important applications of  $\chi^2$ -statistic. 03
- b. A tobacco company claims that there is no relationship between and lungs ailments. To investigate the claim a random sample of 300 males of 40-50 are given medical test. The observed sample results are shown below: 04  
 On the basis of information, can it be concluded that smoking and lung ailments are independent? Use  $\alpha=0.05$ .

(Apply  $\chi^2_{0.05;1}=3.84, \chi^2_{0.05;2}=5.99, \chi^2_{0.05;3}=7.81$ )

	Found lung ail	No lung ailment	Total
Smokers	100	105	205
Non-smo	30	65	95
Total	130	170	300

*Adova*  
6/7/15  
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## Section B

7. a. Define statistics and biostatistics. What are their functions? Being a student of Fisheries, discuss the importance of studying statistics. 05
- b. Suppose you are provided a data set of monthly income (in taka) of 30 workers selected randomly from a fish processing plant 02

- i. Does the data set belong to population or sample?
- ii. Name the variable being measured over here?
- iii. Is the variable discrete, continuous or qualitative?
- iv. If you determine the average income of the given data, would the value represent parameter or statistic?

8. a. Define central tendency. What are its objectives? Mention the desirable characteristics of a good measure of central tendency. 04
- b. The arithmetic mean and geometric mean of weights of two big *Chital* fishes are 6.5 kg and 6 kg respectively. Find the weight of two fishes and hence obtain their harmonic mean. 03

9. a. Define skewness of a frequency distribution. Describe the different methods of measuring skewness of a distribution. 04
- b. A wholesale fish seller sells large fishes. A random sample of 50 large fishes gave an average weight and median weight of 10.75 kg and 10.5 kg respectively with a standard deviation of 1.5 kg. Calculate the coefficient of skewness and comment. 03

10. a. What is binomial experiment? Obtain the binomial distribution of which mean and variance are 6 and 2 respectively. 04
- b. Suppose the daily wages of workers of a factory follows normal distribution with mean wage of Tk. 500 and standard deviation of Tk. 100. Find the probability that a worker gets wage between Tk. 400 and Tk. 650? 03

11. a. Derive the relationship between regression and correlation coefficient. 03
- b. The following data table relates to the advertising expenditure (in lakhs) and sales of (in crores) a super market in selling fish. 04

Expenditure	10	12	15	20
Sales	14	17	23	21

Calculate correlation coefficient and comment.

12. Write short note on (*any two*) from the following: 3.5 × 2 = 07
- a. Arithmetic, geometric and harmonic mean
  - b. Rank correlation
  - c. LSD

**Chittagong Veterinary and Animal Sciences University, Chittagong**  
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B. Sc. Fisheries (Hons.) Year -2 Semester-1 Final Examination' 2015  
Course No: **MFC-201(T)**, Course Title: **Marine Food Chemistry (Theory)**  
Total Marks: 70, Time: 3 hour

Answer any **5 (five)** questions from each section. The figures in the right margin indicate full mark.

**Section-A**

1. a. Write down the classification of marine organisms. Give two examples of each group. 4.0  
b. Mention the english and scientific names of six commercially important shrimp and oyster of Bangladesh. 3.0
2. a. What is edible oyster? 0.5  
b. Describe briefly the commercially important crustaceans available in estuarine and marine water of Bangladesh. 3.5  
c. Describe briefly the green mussel and windowpane oyster. 3.0
3. a. What do you know about by EPA and DHA? 1.0  
b. Describe briefly the benefits of  $\omega$ -6 fatty acid on human health. 5.0  
c. Write down the benefits of monounsaturated fatty acids. 1.0
4. a. What do you mean by vitamin? 2.0  
b. Write down the sources of fat soluble vitamins and their role in human body. 5.0
5. a. What do you mean by PUFA? 1.0  
b. Name the dietary sources of  $\omega$ -3 fatty acids. 1.0  
c. Describe briefly-"lipid metabolism". 5.0
6. a. Write down the names of essential amino acids. 1.0  
b. Describe the role of  $\omega$ -3 on brain function and alzheimer disease. 4.5  
c. Mention the names of different enzymes and their functions in fish body. 1.5
7. a. Why fish is considered as the most perishable food? 2.0  
b. Differentiate between white muscle and dark muscle of fish. 3.0  
c. Draw and label a typical skeletal muscle of fish. 2.0

**Section-B**

8. a. What is CLA? 0.5  
b. Discuss in brief the health implication of CLA. 4.5  
c. Write down the safety rules for CLA supplements. 2.0
9. a. Discuss in brief the commercial use of whale. 4.0  
b. Describe briefly the chemical properties of amino acid. 2.0  
c. Write a short note on muscle development and growth in fish at different stages of life. 1.0
10. a. What do you mean by off-flavor? 2.0  
b. Briefly describe the role of volatile compounds for producing off-flavor in fish and seafood. 5.0
11. a. What do you know about carotenoids? 1.0  
b. Briefly describe the functions and deficiency symptoms of Calcium, Potassium and Iron. 4.0  
c. What do you know about cardiac muscle in fish? 2.0
12. a. What is bio-toxin? 2.0  
b. Write down the causative agents, symptoms and preventive methods of PSP, ASP and DSP. 5.0
13. a. Write down the usefulness of studying flavor chemistry. 1.0  
b. Classify food flavor and give example of each group. 3.5  
c. Describe the role of thiamin and riboflavin on human health. 2.5
14. a. Write a short note on heme-protein. 2.0  
b. Write down the names of seaweeds and their commercial uses throughout the world. 5.0