Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year- 02, Semester-01; Final Examination, 2017
Course No:**FNU-201,** Course Title:**Fish Nutrition (Theory)**
Total Marks: 70; Time: 3 hours

*Answer any **05 (five)** questions from each section. Figures in the right margin indicate full mark. Use separate answer script for each section.*

Section-A

1.	a)	Differentiate between nutrient and nutrition.	2
	b)	Discuss the importance of fish nutrition in aquaculture.	5
2.	a)	Write down the functions of essential amino acids in fish.	2
	b)	Distinguish between amino acid antagonism and amino acid toxicity.	2
	c)	Interpret the fate of absorbed amino acids in fish.	3
3.	a)	Discuss energy balance equation with its usage in aquaculture.	4
	b)	'Energy requirement of fish depends on various factors'- Justify.	3
4.	a)	What is lipid?	1
	b)	Write down the general structure of fish lipid.	2
	c)	Describe the factors affecting the fatty acid composition in fish.	4
5.	a)	Differentiate between FCR and FCE.	2
	b)	Write down the digestive fluids and enzymes secreted in fish with their functions.	5
6.	a)	Explain the utilization of dietary energy in fish.	2
	b)	Differentiate between digestible energy and metabolized energy.	2
	c)	Write down the factors affecting the energy requirement in fish.	3
7.	Write short notes on any **02 (two)** of the following:		3.5X2=7
	a)	Larval fish nutrition;	
	b)	Phospholipids; and	
	c)	Protein energy ratio	

Section-B

8.	a)	Classify vitamins with their trade name.	2
	b)	Enumerate the importance of fat soluble vitamins in fish.	5
9.	a)	Write down the importance of cholesterol.	1
	b)	Illustrate the given abbreviation: i. 6:1n-7, ii.8:2n-6 and iii. 20:4n-6	2
	c)	What do you know about fatty acid synthesis?	4
10.	a)	Discuss the lipid digestion process in fishes.	3
	b)	What do you know about essential fatty acid requirement in fish and shellfish?	4
11.	a)	What is carbohydrate?	1
	b)	Write down the functions of carbohydrate.	2
	c)	Discuss the fate of pyruvate in fish.	4
12.	a)	What are the nutritional disorders in fish?	5
	b)	How can you minimize nutritional disorders in cultured fishes?	2
13.	a)	Write down the importance of broodstock nutrition.	2
	b)	How dietary nutrition level influences the reproductive output of fishes?	5
14.	Write short notes on any **02 (two)** of the following:		3.5X2=7
	a)	Non- nutrient components;	
	b)	Lipid peroxidation; and	
	c)	Specific dynamic action	

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2017
Course No: **MBI-201 (T)**, Course Title: **Marine Biology (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)	What do you know about chemosynthetic bacteria? Discuss the ecological role of marine bacteria in maintaining the food web of marine environment?	1+3
	b)	Briefly describe the abundance of coccolithopores in relations to others planktons depending on the nutrients availability.	3.0
2.	a)	HNLC regions cover 20% of the world's oceans. Discuss the reasons of existence of HNLC region in the world ocean.	2.0
	b)	Discuss the role of coccolithopores in maintaining the food web of marine ecosystem.	3.0
	c)	Why phytoplankton concentration are higher in higher latitude region?	2.0
3.	a)	What is the role of dinoflagellates as endo-symbionts in coral reef ecosystem? Discuss the generalized life cycle and reproduction of marine dinoflagellates.	1+3
	b)	Discuss the negative impacts of dinoflagellates in the marine environment.	3.0
4.	a)	Why cnidarians are often called as animals with stinging cells?	2.0
	b)	Cnidarian often exhibit two body plans in their life cycle. Discuss these two body plans of cnidarians.	2.0
	c)	Discuss the ecological role of sponge in marine environment.	3.0
5.	a)	What do you know about sea urchin, heart urchin and sand dollars? Why some of them are called regular echinoids and irregular echinoids?	1+2
	b)	What do you know about Aristotle's Lanterns? Discuss about the diversity of feeding habits of echinoids in marine environment.	1+3
6.	a)	What do you know about mangrove crab? How many species of mangrove crab are available in the world?	1+1
	b)	Discuss the life cycle of mangrove crab?	3.0
	c)	Discuss why and when high mortality occurs during larval rearing of mangrove crabs in hatchery-based production systems?	2.0
7.	a)	Classify the zooplankton with one example each.	3.0
	b)	Describe the vertical distribution and migration of zooplankton in marine environment.	4.0

Section-B

8.	a)	What is red tide? List the name of the organisms responsible for the formation of red tide.	2.5
	b)	Discuss the impact of red tide in marine environment and aquatic and terrestrial animal health?	3.0
	c)	Planktonic crustaceans are very important as larval foods of marine fish species—Justify the statement.	1.5
9.	a)	Differentiate between seaweeds and sea grasses.	2.0
	b)	What is pneumatocyst? Briefly explain the biological significance of pneumatocyst of seaweeds.	2.0
	c)	Discuss the opportunities and challenges of seaweed culture of Bangladesh.	3.0
10.	a)	What do you know about naked gastropods?	2.0
	b)	Discuss the diversity of common cephalopods available in the marine environment of Bangladesh?	2.0
	c)	Discuss the ecological role of mollusks in the marine environment.	3.0
11.	a)	What do you know about the coral bleaching?Discuss the significance of symbiotic relationship between coral and zooxanthallae algae.	3.0
	b)	Compare the life cycle of seaweed which show alteration of generation and without alteration of generation	4.0
12.	a)	What do you know about sea cucumber? Briefly explain how slow-moving animals such as sea cucumber avoid predation.	1+2
	b)	Discuss about the reproduction and regeneration of Ophiuroids.	4.0
13	a)	List the scientific and local name of ten commercial marine bony fishes of Bangladesh. Discuss the physiological adaptation of marine fishes to live in high saline water.	4.0
	b)	Discuss about the diversity of reproductive modes observed in marine fishes.	3.0
14.	Write short notes on **any two** of the followings: a) Life cycle of Aurelia b) Benthic communities c) Sea anemones d) Ichthyoplankton		3.5×2

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year – 02 Semester – 01, Final Examination 2017

Course No: **MFC-201 (T),** Course Title: **Marine Food Chemistry (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)	Why do you consider fish and shellfish as high quality food? Justify your answer.	2
	b)	Discuss the general characteristics and uses of major seaweed species.	3
	c)	Outline the present status of mollusks in Bangladesh.	2
2.	a)	Draw and label a typical fish skeletal muscle.	1
	b)	Why do you think fish muscle is more perishable than any other meat muscle?	2
	c)	Illustrate the mechanisms of fish muscle contraction and relaxation through actin-myosin filaments.	4
3.	a)	Write down the major problems of chilled and frozen marine products.	3
	b)	Write in brief on the chemical composition of fish.	4
4.	a)	Write down the physical and chemical properties of proteins with examples.	3
	b)	Discuss fish protein based on solubility.	4
5.	a)	Distinguish between fat and oil.	2
	b)	Illustrate the mechanism of lipid metabolism.	5
6.	a)	How does lipid content contribute to palatability and perishability of food?	3
	b)	Briefly describe the uses of marine algae in food industry.	4
7.	a)	Diagrammatically show mechanism of muscle contraction in a demersal fish.	3
	b)	Write down briefly the advantages and disadvantages of freezing whole fish or fillets in all three stages of rigor.	4

Section- B

8.	a)	What is flavour? Describe the compounds responsible for flavour development in fish.	3
	b)	How NPN compounds contribute to the taste and spoilage of seafood.	4
9.	a)	Define bioaccumulation. Diagrammatically show how toxins and harmful chemicals enter into the food chain.	4
	b)	Illustrate the mechanism of TTX bioaccumulation in fish and shellfish.	3
10	a)	Differentiate between food borne infection and intoxication.	2
	b)	List down some practical means of detoxifying shellfish poison.	1
	c)	Discuss the source organisms, symptoms and prevention of DAP.	4
11.	a)	Write down major NPN substances available in fish and shellfish.	3
	b)	Briefly describe the causes and prevention of histamine poisoning.	4
12.	a)	Do you think water soluble vitamins can cause toxicity in human body? Justify your answer.	1
	b)	Differentiate between fat soluble and water soluble vitamins.	3
	c)	Briefly describe the importance of fat soluble vitamins with special emphasis to fish and shellfish.	3
13.	a)	Differentiate between macro and trace elements with examples.	1
	b)	Briefly discuss the sources, functions, and daily requirements of the following elements: Calcium, iodine and phosphorus.	6
14.	a)	Write short notes on the following topics (**any two**):	3.5×2= 7
	b)	a) Carotenoids b) Nutritive value of fish c) Ciguatera fish poisoning	

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2017
Course No: **BIL-201(T)**, Course Title: **Bilogical Limnology (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)	Define limnology and biological limnology.	3.0
	b)	How you will utilize the knowledge of limnology in fisheires?	4.0
2.	a)	What do you mean by biological cycle?	1.0
	b)	"Bacteria is an essential component of bigeochemical cycle" – Explain.	2.0
	c)	Illustrate and elucidate phosphorus cycle.	4.0
3.	a)	Why is carbon di oxide considered as the basis of life? Describe how does carbon cycle work in an aquatic system.	4.0
	b)	Explain any of the two (i)sulphur cycle (ii)calcium cycle.	3.0
4.	a)	Define biological production and carrying capacity.	1.0
	b)	What is primary production and which organisms are responsible for it?	1.0
	c)	Classify algae with examples.	5.0
5.	a)	Describe the life history pattern of copepoda.	4.0
	b)	Why asexual reproduction is prevalent in rotifera and cladocerans?	1.0
	c)	What is cyclomorphosis? Why does it occur in some zooplankton species? What are the stimuli?	2.0
6.	a)	Define biomagnification.	1.0
	b)	Why are Chironomid larvae desirable in aquaculture ponds?	1.0
	c)	Describe life cycle of Chironomid larvae.	5.0
7.	a)	What do you mean by algal blooms?	1.0
	b)	What are the potential sources of algal blooms?	3.0
	c)	Discuss briefly different types of algal toxins commonly found in a waterbody.	3.0

Section-B

8.	a)	Enlist different causal factors regulating biological productivity of inland waters.	2.0
	b)	Classify rivers depending on the continuity of flow.	2.0
	c)	Differentiate between lotic and lentic environment.	3.0
9.	a)	Define micro and macro nutrients with examples.	1.0
	b)	Explain the reason behind using nitrogen and phosphorus fertilizers in fish culture ponds.	2.0
	c)	Illustrate nitrogen cycle and describe it.	4.0
10.	a)	Why eutrophication is undesirable in fish culture ponds?	1.0
	b)	Identify the basic differences between oligotrophic and eutrophic lakes.	3.0
	c)	How does eutrophication occur? Write a note on its control and preventive measures.	3.0
11.	a)	Why is primary production essential for life?	2.0
	b)	Describe the factors affecting primary production.	3.0
	c)	What do you mean by seasonal succession of phytoplankton?	2.0
12.	a)	What is heterogony? Isit found in Cladocesra?	2.0
	b)	Describe general life cycle of Cladocerans.	5.0
13.	a)	What are the types of free living Copepodes?	2.0
	b)	Describe the food and feeding patterns of different kinds of zooplankton.	5.0
14.	a)	Define zooplankton.	1.0
	b)	Write down the importance of zooplankton.	2.0
	c)	Describe briefly life cycle of rotifers.	4.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2017
Course No: **SEB-201 (T)**, Course Title: **Fish Systematics and Evolutionary Biology (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)	What do you mean by systematics?	1.0
	b)	Develop relationship of systematics with other branches of biology.	3.0
	c)	How will you apply your knowledge of systematics in fisheries science?	3.0
2.	a)	Define taxonomy.	1.0
	b)	How morphometric and meristic characters are significant in Fisheries? Explain with examples.	3.0
	c)	'Meristic characters are more important than morphometric characters in fish population studies and species identification'- Justify your answer.	3.0
3.	a)	What do you mean by organic evolution?	1.0
	b)	How you will criticize Darwinism theory of evolution?	2.0
	c)	Explain the evolutionary theory of Lamarckism.	4.0
4.	a)	What is isolation? What are its types?	2.0
	b)	Discuss in detail the mechanism of isolation.	5.0
5.	a)	Define species, sub-species, race and cline.	3.0
	b)	What are the methods of denoting scientific names?	3.0
	c)	Write the principles of zoological nomenclature.	1.0
6.	a)	Define phylogenetics.	1.0
	b)	Justify the importance of phylogenetics.	2.0
	c)	Explain the methods of phylogenetic reconstruction.	4.0
7.	Write short notes on **any two** of the followings: a) Molecular evolution b) Linnaean hierarchy c) Zoogeography d) Biological species concept		3.5×2=7.0

Section-B

8.	a)	What do you mean by taxonomic characters?	1.0
	b)	Make a list of taxonomic characters observed in fish.	3.0
	c)	Outline the key criteria for taxonomic categories.	3.0
9.	a)	What do you mean by convergent and divergent evolution?	2.0
	b)	Discuss the process of evolution in fish.	3.0
	c)	How will you criticize the mutation theory?	2.0
10.	a)	Define homonymy and tautonymy.	2.0
	b)	Explain the different types of homonymy.	3.0
	c)	Compare between synonymy and homonymy.	2.0
11.	a)	What is zoological nomenclature?	1.0
	b)	Why zoological nomenclature is formed?	2.0
	c)	Discuss the 'Principle of Priority' in zoological nomenclature.	4.0
12.	a)	Briefly describe the principle of natural selection.	3.0
	b)	What are the scientific explanations on fish speciation?	4.0
13.	a)	What do you know about phylogenetic classification and relationship?	2.0
	b)	Make a comparison between phylogenetic and Linnaean classification.	3.0
	c)	How will you choose the best cladogram?	2.0
14.	a)	What does Weismann's 'Germ Plasm Theory' state?	1.0
	b)	Explain the main features of germ plasm theory.	4.0
	c)	Justify the significance of germ plasm theory.	2.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2017
Course No: **STA-201 (T)**, Course Title: **Statistics (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) Give an example of qualitative, discrete and continuous variable each. Also mention the right scale to measure the variables. 3.0
   b) If you are given a data set including size of fishes – small, medium and large which graphs would you consider to present the data set? Draw them. 4.0

2. a) Distinguish between primary and secondary data. Name two secondary data sources. 4.0
   b) Discrete variable ONLY take on "Isolated values" – do you agree? Explain. 3.0

3. a) What are the important measures of central tendency? Which is the best measure and why? 4.0
   b) Suppose, you are given a data set of the numbers of fishes consumed by 10 families in a week. The data are: 4, 2, 7, 1, 2, 3, 4, 2, 3, 2. Compute mean, median and mode. 3.0

4. a) Define level of significance and critical region. 2.0
   b) The data of a survey on the customers of two fish selling stores on impulse spending (thousand tk) in a month is : 5.0

	Store –I	Store II
Mean	59	46
SD	0.35	0.42
Size	25	20

Test if there is any significant difference in the mean amount purchased at two stores. Use $\alpha = 0.05$ (Given, $t_{0.05, 45} = 1.679$, $t_{0.025, 43} = 2.017$, $t_{0.025, 45} = 2.014$).

5. a) What do you mean by skewness and kurtosis? 3.0
   b) Suppose the 3rd and 4th central moments of a distribution of the weight of fishes are 12.24 and 905.31. The SD is 4.28. Find the coefficient of skewness and kurtosis. 4.0

6. a) Define Spear man Rank Correlation Coefficient. When it can be used? 3.0
   b) The following data refer to the age and weight of a particular variety of fish. 4.0

Age (in week)	1	2	3	4	5
Weight (in kg)	0.2	0.35	0.5	0.8	1.0

Compute rank correlation and comment.

Section-B

7. a) Which tests will be performed under the following conditions: 3.0
   i) $\mu = 3$kg, $n = 10$, $s = 0.25$ kg
   ii) $\mu_1 = \mu_2$, $n = 50$, $s = 0.36$ kg
   iii) $\sigma^2 = 0.5$ kg, $n=30$
   b) Distinguish between parametric and non-parametric test. 2.0
   c) Write some properties of χ^2 (Chi-square). 2.0

8. a) Describe a probability distribution whose mean > variance. 3.0
   b) Suppose the length of fishes of a pond is normally distributed with mean 21cm and SD 2cm. A fish is randomly selected from the pond. What is the probability that the length is – 4.0

$(> 20) =$

i) more than 20 cm
ii) less than 15 cm
iii) equal to 22 cm

(Given, P[z ≤-0.5]=0.3085, P [z ≤-0.51]=0.0350, P [z ≤-3.0]=0.0013, P [z ≤-2.9]=0.0019)

9. a) Define simple linear regression with an example. 2.0
b) The following data refer to the weight and length of Tilapia fishes: 5.0

Weight (in Kg)	0.5	0.7	0.9	1.0	1.2	1.5
Length (in cm)	14	15	17	19	22	25

i. Fit the regression line of weight on length
ii. What will be the weight of fishes if the length is 27 cm?

10. a) "CV is the best measure of dispersion"-comment. 2.0
b) The following data give the weight (in Kg) of 10 rupchanda fishes: 5.0
0.25, 0.20, 0.27, 0.30, 0.21, 0.22, 0.29, 0.26, 0.23, 0.25
Obtain Q_2, D_7, Q_1, P_{50}, P_{79} and comment.

11. a) Describe the principles of experimental design. 3.0
b) Distinguish between CRD and RBD. 3.0
c) When RBD will turn into CRD? 1.0

12. a) Define probability. 1.0
b) Extract an example of RBD in your field and identify treatment, block, experimental unit and yield in the example. 4.0
c) Suppose P[A]=0.8, P[B]=0.6 and P[AB]=48. Is the event independent? 2.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
Year -02, Semester-01, Final Examination' 2014
Course No: **MBI-201**(T), Course Title: **Fish Systematics & Evolutionary Biology**
Total Marks: 70, Time: 3 hours

Answer any five (05) questions from each section

Section-A

1.	a)	Define Systematics.	1
	b)	Differentiate between 'taxon' and 'category'.	2
	c)	Write down the importance of Systematics in fisheries education.	4
2.	a)	What do you mean by taxonomic character?	1
	b)	List down different taxonomic characters.	4
	c)	"Reproduction is the behavioral characters"-Explain.	2
3.	a)	Define evolution.	1
	b)	Write down the name of four theory of evolution.	2
	c)	Diagrammatically show the chemical and organic evolution from the beginning of earth.	4
4.	a)	Define Speciation.	1
	b)	What forces affect Speciation process?	4
	c)	Define Sympatric and Allopatric species with example.	2
5.	a)	Define survey.	1
	b)	Write down the importance of survey.	2
	c)	What qualities should possess a good survey question?	2
	d)	Mention the effects of survey activities.	2
6.	a)	Differentiate mollusks from crustaceans.	2
	b)	Classify giant freshwater prawn up to species.	1.5
	c)	Illustrate the external morphology of crayfish.	3.5
7.	Write short note on following topics: (any two)		2×3.5= 7
	a)	Type Method	
	b)	Darwinism	
	c)	Hydroacustics survey	
	d)	Pigmentation and Colour pattern	

Section-B

8.	a)	Describe the basic idea of Lamarckism with diagram.	5
	b)	How do you criticize Lamarckism Theory?	2
9.	a)	Define species and sub-species.	1
	b)	Write down the name of different species concept.	3
	c)	How speciation occurs in fish?	3
10.	a)	Define Synoymy and Homonymy.	2
	b)	Why common name are generally not used by the scientists?	2
	c)	Describe the different types of Synonymy.	3
11.	a)	List scientific names of 5 (five) Crustaceans and 5 (five) mollusks.	3
	b)	Illustrate the external morphology of a prawn.	3
	c)	What is the economic significance of crustaceans?	1
12.	a)	Write down the name of different fisheries survey techniques.	2
	b)	How will you differentiate canoe electrofishing survey from backpack survey?	2
	c)	Describe the effects of survey activities in water	3
13	a)	How fins structure helps in making classification system?	5
	b)	Describe Molecular characteristics in fish taxonomic characters.	2
14.	a)	Classify *Octopus* and *Sepia* up to species.	3
	b)	Compare and contrast the general features of *Octopus* and *Sepia*	4