Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B.Sc. Fisheries (Hons.) Year-02 Semester 01, Final Examination' 2016
Course code: **BIL-201(T),** Course Title**: Biological Limnilogy (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)	Define limnology and biological limnology.	2.0
	b)	Write down the scopes of limnological study in fisheries science.	3.0
	c)	Differentiate limnology with ecology.	2.0
2.	a)	What are the major differences between pond and lake?	2.0
	b)	Classify ponds based on their origin.	3.0
	c)	Why limnology is called a synthetic science?	2.0
3.	a)	What is primary production?	1.0
	b)	"Primary production is the basis of all lives on the earth"- justify.	2.0
	c)	Discuss the factors responsible for the fluctuation of primary production.	4.0
4.	a)	What do you mean by biogeochemical cycle?	2.0
	b)	What are the limiting factors in aquaculture ponds?	1.0
	c)	Briefly describe the nitrogen cycle in an aquatic environment.	4.0
5.	a)	Define river. What are the major sources of river?	2.0
	b)	What are the significances of river?	1.0
	c)	Discuss the major river systems in Bangladesh.	4.0
6.	a)	What do you mean by eutrophication and algal blooms?	2.0
	b)	Write down the potential sources of algal blooms.	1.0
	c)	Briefly discuss the different types of algal toxins commonly found in a waterbody.	4.0
7.	a)	What is zooplankton?	1.0
	b)	Write down the major groups of zooplankton with example.	2.0
	c)	Describe the food and feeding habit of Cladocera and Copepoda.	4.0

Section-B

8.	a)	Why asexual reproduction is prevalent in Rotifera and Cladocerans?	2.0
	b)	Illustrate and explain the life cycle of Cladocerans.	5.0
9.	a)	"The river is a lotic environment"- justify.	1.0
	b)	Write down the major differences between lotic and lentic environment.	4.0
	c)	Write down the source and course of the longest river of Bngladesh.	2.0
10.	a)	What are the characteristics of eutrophic lake?	2.0
	b)	What do you mean by natural and artificial eutriphication?	2.0
	c)	Write a short note on control and preventive measures of eutrophication.	3.0
11.	a)	Why nitrogen and phosphorus are limiting factors for primary production?	2.0
	b)	Write in brief the role of bacteria in nutrient cycle.	2.0
	c)	Briefly describe phosphorus cycle in aquatic waterbody.	3.0
12.	a)	How would you enhance zooplankton production in fish pond?	2.0
	b)	Describe life history pattern of Rotifera.	5.0
13.	a)	What is Cyclomorphosis?	1.0
	b)	What are the stimuli responsible for this event?	1.0
	c)	Classify algae with examples.	5.0
14.	a)	Classify zooplankton based on their size.	2.0
	b)	Give a life cycle of a common group of benthos.	5.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2016
Course No: **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 mean by 'Marine Biology'? 2.0
   b) Describe the different zones of the marine environment with example. 3.0
   c) 'Advancement of satellite technology enhances the prospect of marine biology' – explain the statement. 2.0
2. a) What are the differences between seaweed and seagrass? 1.5
   b) Mention the physiognomies used to classify seaweeds. 1.5
   c) Write down the functions of seaweeds in aquatic habitats. 1.0
   d) Describe the culture technique of *Hypnea sp.* in Bangladesh. 3.0
3. a) How eutrophication mechanisms occur in our coastal belt? 2.0
   b) Illustrate the migration pattern of marine zooplankton. 3.0
   c) Briefly discuss the diversity of phytoplankton in the coastal belt of the Bay of Bengal. 2.0
4. a) What do you mean by algal bloom? 2.0
   b) Describe the mechanisms of HABs. 2.0
   c) Illustrate the effects of salinity and temperature changes in the marine environment. 3.0
5. a) What are the biological roles of oysters in water filtration process? 2.0
   b) Specify the biological features of mesopelagic and pelagic fishes of the Bay of Bengal. 3.0
   c) What are the major ecological and biological impacts of bloom formation? 2.0
6. a) 'Benthic community influences the nutrient characteristics of benthic environment' – justify the statement. 3.0
   b) Discuss the management practices to prevent marine fisheries resources in the Bay of Bengal. 2.0
   c) Briefly discuss some important echinoderms available in the coastal belt of Bangladesh. 2.0
7. Write **any 2 (two)** short notes on the followings: 3.5 x 2 = 7.0
   a) Benthic communities, (b) Biology of *Penaeus monodon*, (c) Ocean and sea, and (d) Mud crab.

Section – B

8. a) What is Ichthyoplankton? 1.0
   b) Draw a fish egg showing its various sections. 2.0
   c) Mention the sampling procedure of Ichthyoplankton. 2.0
   d) Describe the temporal distribution of Ichthyoplankton in south-eastern coastal water of Bangladesh. 2.0
9. a) Why phytoplanktons treat as primary producer? 1.0
   b) Narrate the relationship among phytoplankton, zooplankton and marine fish species. 3.0
   c) Illustrate the culture techniques and species selection processes in oyster culture. 3.0
10. a) State the available turtle species of Bangladeshi coast. 1.0
    b) What are the migration pattern and their mechanism for estuarine fish species? 3.0
    c) Illustrate the distribution and culture techniques of *Penaeus monodon.* 3.0
11. a) What do you mean by demersal fishes? 1.0
    b) Illustrate and sketch the biological history of a demersal fish species 3.0
    c) Narrate the feeding mechanisms and distribution pattern of ichthyoplankton. 3.0
12. a) Define exploitation and exploration. 2.0
    b) Illustrate the probability and scopes of pearl culture to retain national economy. 3.0
    c) Specify the anthropogenic impacts on the seas. 2.0
13. a) What are the substrate, cultch and spat? 1.0
    b) Discuss the bottom and off bottom culture system of mollusc. 5.0
    c) Why water quality is important in mollusc culture? 1.0
14. Write **any 2 (two)** short notes on the followings: 3.5 x 2 = 7.0
    a) Metazoa taxonomy, b) Osmoregulation, c) Copepod reproduction and d) Red tide

Chittagong Veterinary and Animal Sciences University, Chittagong

Faculty of Fisheries

B.Sc. Fisheries (Hons.) Year-02, Semester 01; Final Examination' 2016

Course code: **FNU-201(T),** Course Title**: Fish Nutrition**

Total Marks: 70, Time: 3 hours

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

Section-A

1.	a)	Define nutrient and nutrition.	2.0
	b)	Discuss the importance of fish nutrition in aquaculture.	5.0
2.	a)	Name the essential and nonessential amino acids for fish.	2.0
	b)	Write down the functions of amino acids.	2.0
	c)	Describe the fate of absorbed amino acids in fish.	3.0
3.	a)	What is meant by hypervitaminosis?	2.0
	b)	Describe different vitamin deficiency signs in fishes.	5.0
4.	a)	What is lipid?	1.0
	b)	Write down the functions of lipid.	2.0
	c)	Describe the factors affecting fatty acid composition in fishes.	4.0
5.	a)	Differentiate between FCR and FCE.	2.0
	b)	Write down the digestive fluids and enzymes secreted in teleosts with their functions.	5.0
6.	a)	Differentiate between digestible energy and metabolizable energy.	2.0
	b)	Explain the process of utilization of dietary energy in fishes.	3.0
	c)	Write down the factors affecting energy requirement in fishes.	2.0
7.		Write short notes on any **02 (two)** of the following:	3.5x2.0=7.0
	a)	Protein-energy ratio,	
	b)	Amino acids requirement in fishes and	
	c)	Larval fish nutrition	

Section-B

8.	a)	Classify carbohydrates with examples.	3.0
	b)	Enumerate carbohydrate metabolism in fishes.	4.0
9.	a)	Write down the importance of cholesterol.	1.0
	b)	Illustrate the given abbreviation: i)16:1n-7, ii)18:2n-6, and iii) 20:4n-6	3.0
	c)	What do you know about fatty acid biosynthesis?	3.0
10.	a)	Discuss about electrostatic forces, hydrogen bonds and hydrophobic forces.	4.0
	b)	Which factors are responsible for varying amino acids in fishes?	3.0
11.	a)	Define digestion and absorption.	2.0
	b)	What do you know about fat digestion in fishes?	3.0
	c)	Write down the factors affecting rate of digestion in fishes.	2.0
12.	a)	Write down the importance of broodstock nutrition.	2.0
	b)	How dietary nutrient level influences the reproductive output of fishes?	5.0
13.	a)	Classify minerals in respect of their requirements in fishes.	1.0
	b)	Write the functions of any three of the following minerals: i)Calcium, ii)Phosphorus, iii)Selenium and iv)~~Selenium~~ Iron	6.0
14.		Write short notes on any **02 (two)** of the following:	3.5x2.0=7.0
	a)	Energy balance equation,	
	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' 2016
Course code: **SEB-401(T),** Course Title**: Fish Systematics and Evolutionary Biology (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)	Define fish systematics?	1.0
	b)	What are the basic differences between systematics and taxonomy?	2.0
	c)	Write down the importance of studying fish systematics.	4.0
2.	a)	Define taxonomy.	1.0
	b)	Differentiate between the pairs: i) taxon and category; and ii) Sympatric and allopatric species	3.0
	c)	How do morphometric characters help in taxonomic classification?	3.0
3.	a)	Define speciation.	1.0
	b)	What are the forces of speciation?	2.0
	c)	Briefly describe the patters of speciation.	4.0
4.	a)	What do you mean by Darwinism?	1.0
	b)	Make some drawbacks and criticism of Darwinism.	2.0
	c)	Briefly describe the Lamarckism theory with diagram.	4.0
5.	a)	Define species, sub-species and sibling species.	2.0
	b)	How to write scientific name of a fish?	2.0
	c)	Briefly describe the principles of priority in zoological nomenclature.	3.0
6.	a)	Define zoogeography.	2.0
	b)	What are the zoogeographic types of freshwater fishes?	2.0
	c)	Enlist the zoogeographic areas of marine fishes of the world.	3.0
7.	a)	Define phylogeny and cladistics.	2.0
	b)	What are the basic assumptions of cladistics?	2.0
	c)	Write down the importance of studying phylogeny.	3.0

Section-B

8.	a)	Write down the functions of taxonomic characters.	2.0
	b)	What are the requirements for taxonomic description?	3.0
	c)	Point out the criteria for taxonomic categories.	2.0
9.	a)	Define evolution and organic evolution.	2.0
	b)	Diagrammatically show the chemical and organic evolution of the earth.	3.0
	c)	Write down the characteristics of mutation theory.	2.0
10.	a)	Define synonymy.	1.0
	b)	What are the different types of synonymy?	3.0
	c)	What do you know about typification?	3.0
11.	a)	Define isolation with their types.	3.0
	b)	Describe briefly the isolating mechanisms.	4.0
12.	a)	What does zoological nomenclature principally regulate?	2.0
	b)	Why nomenclature may change?	3.0
	c)	Write down the disadvantages of using common name.	2.0
13.	a)	Define phylogenetic tree.	1.0
	b)	Compare among distance methods, maximum parsimony and maximum likelihood methods.	4.0
	c)	Differentiate between using of molecular data and morphological data in phylogeny construction.	2.0
14.	a)	Write short note on **any 2 (two)** of the followings: a. Natural selection, b. Molecular evolution, and c. Species concept.	3.5×2=7.0

Chittagong Veterinary and Animal Sciences University, Chittagong

Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year-02 Semester 01, Final Examination' 2016

Course code: **STA-201(T),** Course Title**: Statistics (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.		Define statistics with its function. Write down the importance of statistics in fisheries.	4.0
		What is measurement scale? Discuss different types of it.	3.0
2.		Why do we need the measures of dispersion inspite of control location? There are two sets of data collecting from two sources of water namely pond and haor. The fish weights (kg) are: 4.5, 3.0, 5.7, 7.8 and 10.2; and 6.0, 9.0, 12.2, 3.35 and 15.5 for pond and haor respectively. Which water sources of fish weights are more consistent?	4.0
	b	Define skewness and kurtosis. A fish distribution data with $\beta_1 = 0$ and $\beta_2 = 3$. Which frequency distribution curve adjusts the above equations?	3.0
3.	a	Define standard deviation and coefficient of variation.	2.0
		Mr. Rahman wants to buy 150 pieces of rupchanda fishes for a party each of which should be around 0.25kg. Two fishermen have rupchanda fishes with the following summary statistics:	5.0

	Fisherman A	Fisherman B
Average weight	o.25kg	0.25kg
Standard deviation	0.125kg	0.075kg

From which fisherman Mr. Rahman will buy ru chanda for the art and wh ?

4	a	What is correlation coefficien ? How does it differ from re ession coefficient?	4.0
	b)	Comments on: r_x =0.75, b = 2.3 a d r_x = 0.	3.0
5	a)	What is factorial experiment des gn? Why asymmetrical factorial design is better than symmetrical factorial desi n?	4.0
		Write down the treatment combinations of 2^2, 2^3, and 3^2 factorial desi gns.	3.0
6.	a)	Define Karl Pearson's simple correlation coefficient. State two important properties of correlation oefficient.	3.0
	b)	The following data relate to the age and weight of a particular variety of fish:	4.0

Age in week	2	3	4	5	6
Weight in kg	0.2	0.4	0.7	0.8	1.0

Find the correlation co-efficient between the a e and wei ht of the fish and comment.

Section-B

7.	a)	What is analysis of covariance (ANCOVA)? State the points of difference between analysis of variance (ANOVA) and (ANCOVA).	4.0
	b)	Write down the difference between census and sam le survey.	3.0
8	a)	Briefl discuss the requirements of testin a h pothesis.	4.0
	b)	A 15 random samples of tuna fish drawn from a population consistin 15 ifferent fat content value. The seller claims that the average fat content of tuna fish i 5 . i) State the hypothesis for the claim and write the appropriate test statistic. ii) If the variance of fat content is 4m , what will be the test statistic?	3.0
9.	a)	efine mutually exclusive and independent of two events. Mutually exclusive events can never be i endent- ustif	3.0
	b)	uppose P[A]=0.7, P[B]=0.8 and P[AB]=0.56. Find P[$\bar{B}$], P[A U B] and P[AB]. Are A and B inde endent?	4.0
10.	a)	iscuss censorin with its classification.	4.0
	b)	What is survival analysis? How ou will use it in fisheries sector?	3.0
1 .	)	Define sampling with its classification. What is simple random sampling and stratified random sam lin ?	4.0
	b)	Determine sam le size for estimatin the o ulation mean.	3.0
1		What is classical robabili ? What are its drawbacks? State the additive law of robabili .	4.0
		What are the discrete probability distributions? The probability of fish affected by fin rot is 0.04. If 5 fishes are caught from the pond, what is the probability that- i) No fishes are affected ii) At least two fishes are affected.	3.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year – 04 Semester – 01, Final Examination 2016
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 as high quality food? Justify your answer.	2.0
	b)	Enlist 05 (five) examples of commercially important marine shrimp with their common and scientific names.	1.0
	c)	Give a brief description of main groups of marine food organisms available in Bangladesh.	4.0
2.	a)	What do you know about free fatty acid?	1.0
	b)	Define essential, semi-essential and non-essential amino acids with example.	2.0
	c)	Write in brief the effects of non-protein nitrogenous compounds on quality change in marine fishes after death.	4.0
3.	a)	Classify marine algae with examples.	1.0
	b)	What do you know about the collection and processing of algae in context of Bangladesh?	3.0
	c)	Name 06 (six) commercially important seaweeds with their main uses.	2.0
	d)	What is windowpane oyster? Why it is important?	1.0
4.	a)	Differentiate between fat and oils.	2.0
	b)	Briefly describe the beneficial effects of mono unsaturated fatty acids on human health.	3.0
	c)	What is rancidity of lipid? How would you prevent lipid oxidation in Fish? Name two natural antioxidants.	2.0
5.	a)	What are ω 3 and ω 6 fatty acids? Give examples?	2.0
	b)	Write down the dietary sources of ω 3 fatty acids.	2.0
	c)	Briefly describe the beneficial effects of ω 6 fatty acids on human health.	3.0
6.	a)	Write in brief properties of white and dark muscles.	3.0
	b)	Write down the general characteristics of sarcoplasmic and myofibrillar protein.	4.0
7.	a)	Draw and label a typical fish skeletal muscle.	1.0
	b)	"Fish and shellfish are most perishable food" – justify your answer.	2.0
	c)	Briefly describe the mechanism of muscle contraction in fish.	4.0

Section-B

8.	a)	Describe fish protein on the basis of solubility.	4.0
	b)	Write down the composition of white and dark muscle of fish.	3.0
9.	a)	"Sea foods is the rich source of nutrients"- justify your answer.	3.0
	b)	Write in brief about water and fat soluble vitamins in fish.	3.0
	c)	Write down the major available forms of vitamin D in fish.	1.0
10.	a)	Prepare a list of marine biotoxins mentioning their sources.	3.0
	b)	Write in brief the importance of micro and macro element.	2.0
	c)	Make a list of nutritional diseases in human.	2.0
11.	a)	Write down the physical and chemical properties of amino acids.	3.0
	b)	"Proximate composition of fish is very important to a fish processor"-justify.	2.0
	c)	Name the major carotenoids found in fish, crustaceans, mammals and mollusks.	2.0
12.	a)	What is flavor? Write down the name of compounds responsible for flavor development in fish.	2.0
	b)	What is histamine poisoning? How does it take place? How can you prevent histamine poisoning?	5.0
13.	a)	Define bioaccumulation. Illustrate the mechanism of TTX bioaccumulation in puffer fish.	3.0
	b)	Give examples of 05 (five) algal species responsible for DAP.	1.0
	c)	Write down the source organisms, symptoms and prevention of NSP.	3.0
14.	a)	Define macro and trace elements with examples.	1.0
	b)	Briefly discuss the sources, functions and daily requirements of the following elements (any three): (i) Calcium, (ii) Iodine, (iii) Phosphorus, and (iv) Zinc.	6.0