Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019
Course No: **FNU-201 (T),**Course Title: **Fish Nutrition (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 fish nutrition. Explain the principles of fish nutrition. 3
   b) Justify the nutritional parameters for nutrient requirement studies. 4

2. a) Mention some basic nutritional characteristics of fish and crustaceans. 3
   b) Discuss the implication of the science of nutrition in aquaculture development. 4

3. a) Explain the functions of carbohydrates in fish nutrition. 3
   b) Describe the dietary carbohydrate requirement in different types of cultured fishes. 4

4. a) What is amino acid? Mention the names of ten essential amino acids. 3
   b) How can you determine the total protein requirement and equilibrium of essential amino acids in formulated diet? 4

5. a) Describe the nutritional aspects of fat soluble vitamins of fish. 3
   b) How can you measure the performance of a formulated diet in terms of growth, survival and food conversion? 4

6. a) Illustrate the process of dietary energy utilization in fish. 3
   b) How you will calculate the dietary energy requirements in fish? 4

7. Write down short notes on any two of the followings: 3.5 X 2 = 7
   a) Specific dynamic action; b) Crude fibre; c) Biological energy

Section B

8. a) What do you understand by lipid per oxidation? How it affects feed quality? 4
   b) Mention the names of some anti-oxidants used in aquaculture feed. 3

9. a) Identify common nutritional disorders found in cultured fish. 3
   b) Evaluate the reasons of nutritional disorder and recommend their preventive measures. 4

10. a) Draw the digestive system of different types of fishes. 3
    b) Enlist the digestive fluids and enzymes of teleosts with their functions. 4

11. a) Write down the advantages and disadvantages of fishmeal in formulated diet. 3
    b) Give a brief account on the common feed ingredients available in Bangladesh. 4

12. a) Distinguish the factors influences the energy requirement of fish. 3
    b) Explain the biological functions of Phosphorus and Iron with their dietary sources. 4

13. a) Identify the factors affects the rate of digestion. 3
    b) Explain how you will measure the percent of digestibility. 4

14. Write down short notes on any two of the followings: 3.5 X 2 = 7
    a) Anti-nutritional factors; b) FCR and FCE; c) Fatty acid metabolism

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019
Course No: **CAM-201 (T),**Course Title: **Coastal Aquaculture and Mariculture (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) Differentiate between off bottom and on bottom culture techniques. 3
   b) "Viability of coastal aquafarming is largely dependent on proper site selection" – explain. 4

2. a) What do you know about the food and feeding habit of *Penaeus monodon*? 3
   b) Summarize the life history phases of *Penaeus monodon.* 4

3. a) How will you breed Moorish Idol in an aquarium? 3
   b) Explain the potentiality to develop the marine ornamental fish breeding and expansion of its culture in Bangladesh. 4

4. a) Summarize different culture techniques of seaweed. 3
   b) Compare the pros and cons of the different culture methods of seaweed and select the best possible method. 4

5. a) Why coastal shrimp farmers are moving towards soft –shell crab farming? 3
   b) " Breeding and successful seed production of seabass and crab is a hot cake" – explain. 4

6. a) Briefly discuss about mass seed production of tilapia. 4
   b) What are the hatchery management techniques of tilapia? 3

7. Write down short notes on any two of the followings: 3.5 X 2 = 7
   a) Green mussel culture; b) Hanging culture of scallop; c) Eye stalk ablation

Section B

8. a) Give a comparison among the three main culture systems in Bangladesh. 4
   b) How does integrated multi-trophic aquaculture (IMTA) can reduce environmental impacts? 3

9. a) Select an appropriate shellfish species for cage culture in marine environment. 3
   b) Explain the site selection criteria for seaweed culture. 4

10. a) Illustrate the broodstock replacement practices followed by hatchery owners in Bangladesh. 3
    b) Explain the larval rearing process of shrimp in hatchery. 4

11. a) Briefly explain broodstock collection and handling techniques of seabass. 4
    b) Describe the hatchery operation of seabass in brief. 3

12. a) Explain the prospects of grouper fish farming in saline water. 3
    b) "Indian salmon and Hilsha are the two most important species" – why? 4

13. a) Identify the major challenges against the culture of saline water fishes in Bangladesh. 3
    b) Culture of euryhaline fish is a challenge or blessing? –justify. 4

14. Write down short notes on any two of the followings: 3.5 X 2 = 7
    a) Aerator and blower; b) Blue economy; c) Induced maturation

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year-2 Semester-1, Final Examination 2019

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 mean by marine ecological division?	1.0
	b)	Differentiate between marine biology and biological oceanography.	1.5
	c)	Write down the scope of marine biology.	1.5
	d)	Briefly discuss the pelagic division of the ocean with example.	3.0
2.	a)	What is naked gastropod?	1.0
	b)	Compare different bivalve adaptations to different habitats.	3.0
	c)	Illustrate the life cycle and reproduction of *Perna viridis.*	3.0
3.	a)	Describe the terms benthos and marine snow.	3.0
	b)	How do different factors affect distribution of benthic communities?	4.0
4.	a)	Explain diatomaceous earth and its role in marine aquatic environment.	3.0
	b)	Summarize phytoplankton-zooplankton interrelationships with marine fish production.	4.0
5.	a)	Why cnidarians are called animals with stinging cells?	2.0
	b)	Explains how slow moving animals such as sea cucumbers avoid predation.	2.0
	c)	Conclude the reproduction types in case of marine sponge.	3.0
6.	a)	What is ecosystem? What are the basic components of an ecosystem and how they interact to each other?	3.0
	b)	How can you differentiate between habitat and niche?	1.0
	c)	What is biogeochemical cycle? Show the biogeochemical cycle of carbon in an estuarine ecosystem.	3.0
7.	Write down short notes on followings (Any Two):		3.5 X 2 = 7

(i) Benthic communities; (ii) HABs; (iii) Salt marsh; (iv) Sand dune and island

Section B

8.	a)	What is virion?	1.0
	b)	"Bacteria act as key organisms which help in nutrients availability in oceanic environment"- Explain the statement.	3.0
	c)	Discuss the role of coccolithophore and radiolarian in marine aquatic environment.	3.0
9.	a)	Properly mention the name, area boundary and ban periods of five nursery grounds of hilsha in Bangladesh.	2.0
	b)	Briefly describe the life cycle of *Mugil cephalus.*	4.0
	c)	Describe the modes of brooding of shark.	1.0
10.	a)	What is propagule?	1.0
	b)	Write down the human uses of mangroves.	2.0
	c)	Interpret the adaptations that have evolved in salt marsh communities to survive in high salt content areas.	4.0
11.	a)	What is smolt and alevins?	2.0
	b)	What important ecological contribution do burrowing organisms make to the environment?	3.0
	c)	Draw the life cycle of Jelly fish.	2.0
12.	a)	Define seaweed and seagrass.	2.0
	b)	Discuss the constraints and prospects of seaweed farming in Bangladesh.	2.0
	c)	Diagrammatically show the life cycle of green algae.	3.0
13.	a)	Mention the living, non-living and intangible resources in the sea.	2.0
	b)	Briefly describe different features of deep sea system of marine environment	3.0
	c)	"Neritic zone is the most productive zone in the marine environment"- Justify the statement.	2.0
14.	a)	Name four commercially important crustaceans available in Bangladesh.	1.0
	b)	Distinguish between chelicerates and mandibulates.	2.0
	c)	Summarize the life cycle of mud crab with its distribution.	4.0

Chittagong Veterinary and Animal Sciences University, Chittagong

Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019

Course No: **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) Define statistics. Point out some practical applications of statistics. Identify: i) Sample; ii) Parameter; iii) Statistic and iv) Questionnaire. 4
   b) Distinguish finite population and infinite population and discrete variable and continuous variable. 3
2. a) What is frequency? Indicate different steps involved in the construction of a frequency distribution. List the different types of graphs and diagrams used for representing quantitative data. 4
   b) Identify the scale of measurements to which the following variables belong: i) Species of fish; ii) Weight of fish; iii) Fish scale color; iv) Temperature of storage fish; v) Time of day and vi) SAT score. 3
3. a) Outline desirable properties of a good measure of central tendency. 'Mention the name of the best measure of central tendency'- justify. 4
   b) Define skewness and kurtosis with classification of kurtosis. 3
4. a) What do you understand by dispersion of a set of data? State the name of different measures of dispersion. Each 100 gm tuna fish contains 20700 mg, 8400 mg, 14mg, and 0.9 mg protein, fat, calcium and iron respectively. Calculate the population standard deviation. 4
   b) Identify the moments with classification. Write the formula of skewness and kurtosis based on moments. 3
5. a) What is sampling? Write down the advantages of sampling over complete enumeration. 4
   b) Mention the principle of sampling. List the name of all sampling methods. 3
6. a) What is data? Classify the data according to origin. 4
   b) Define standardized variable. Show that the mean of standard variable is zero and its variance is one. 3

Section B

7. a) Define positive correlation and negative correlation with example. Interpret when r = 0 and b_{yx} = -1.3. 4
   b) Explain Karl Pearson's coefficient of correlation. Write down the important properties of coefficient of correlation. 3
8. a) Express the properties of Binomial distribution and Normal distribution. 4
   b) Define: i) Mutually exclusive event; ii) Sample space and iii) Favourable outcome. 3
9. a) Write down the steps to conduct test of significance of two independent population mean when sample size is very large. 4
   b) Identify: i) Null hypothesis; ii) Level of significance and iii) Standard error. 3
10. a) What do you mean by design of an experiment? What are its purposes? Define Treatment and Block. 4
    b) Give the layout of Completely Randomized Design (CRD). 3
11. a) Mention the applications of χ^2 distribution. One hundred and sixty fisheries graduates' were interviewed and classified according to their result and job satisfaction. Write the appropriate test name to test the significance whether the result and job satisfaction are independent? 4
    b) State the properties of a good estimator. List the different test names to conduct multiple comparison tests. 3
12. a) Mention the all variance related significance tests with their hypothesis and test statistic. 4
    b) Differentiate between random sample and simple random sample. 3

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019
Course No: **SEB-201 (T)**, Course Title: **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)	Define systematics and evolutionary biology.	2
	b)	Justify the importance of studying systematics and evolutionary biology in fisheries.	3
	c)	What are the basic differences between systematics and taxonomy?	2
2.	a)	Define sub-species, varieties and race.	3
	b)	How do you describe the concept of species in terms of biological and ecological perspectives?	4
3.	a)	What is taxonomic character and what functions does it perform?	2
	b)	Make a list of taxonomic characters observed in fish.	2
	c)	Outline the key criteria for taxonomic categories.	3
4.	a)	What is isolation? Mention the types of isolation.	2
	b)	Explain how does reproductive isolating mechanism occur?	5
5.	a)	Write down the theories of organic evolution.	3
	b)	Describe briefly the mechanism of evolution in fishes at molecular level.	4
6.	a)	What is ICZN code? What does ICZN code principally regulate?	2
	b)	Explain the principle of binomial nomenclature and principle of priority with example.	5
7.	a)	Define phylogenetics and cladistics.	2
	b)	Make a comparison between Linnaean classification and phylogenetic classification.	2
	c)	Diagrammatically show the different parts of a phylogenetic tree.	3

Section B

8.	a)	What is taxonomy?	1
	b)	Explain how morphometric and meristic characters are significant in taxonomic study of fish.	3
	c)	What are the requirements for taxonomic description of a taxon?	3
9.	a)	What is convergent and divergent evolution?	2
	b)	Explain the mechanisms by which biological evolution takes place.	5
10.	a)	Define phylogeny, phylogenetic tree and cladogram.	3
	b)	Explain the maximum parsimony methods of phylogenetic tree construction with its advantages and disadvantages.	4
11.	a)	Define evolutionary influences.	2
	b)	How do the evolutionary influences affect genetic diversity?	5
12.	a)	Define zoological nomenclature? Why nomenclature may change?	2
	b)	What are the basic features of zoological nomenclature?	2
	c)	How will you give a scientific name for a new fish species?	3
13.	a)	What is synonymy and homonymy?	2
	b)	Explain different types of synonymy with examples.	5
14.	Write down short notes on any ***02 (Two)*** of the following: i) Linnaean hierarchy; (ii) Natural selection; iii) Taxonomic lineage; iv) Speciation		$3.5 \times 2 = 7$

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019

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)	Briefly describe the importance of "Marine Food Chemistry" in food industry.	3
	b)	Write down the major health benefits of fish consumption.	2
	c)	Prepare a list of commercially important estuarine and marine fishes of Bangladesh.	2
2.	a)	Enlist scientific name and common name of 5 (five) commercially important shrimp species found in Bangladesh.	2
	b)	Discuss physical and chemical properties of amino acid.	2
	c)	Classify fish protein on the basis of solubility.	3
3.	a)	Why fish is more perishable than any other organism? Justify your answer.	2
	b)	What is rancidity? How will you prevent lipid oxidation in fish? List down the name of 2 (two) anti-oxidants.	~~3~~ 2
	c)	Write down the health benifits of Gamma linolenic acid	2
4.	a)	Define rancidity. Prepare a list of chemicals that can be used to minimize rancidity problem in food.	3
	b)	Diagrammatically show the process of protein degradation during spoilage.	2
	c)	How do you judge quality of fish using descriptive method?	2
5.	a)	"Dietary deficiency of vitamin K usually does not occur in adult but occurs in infants"-justify the statement.	1
	b)	What are the major available forms of vitamin D? Mention the major deficiency syndromes caused by vitamin E and K.	2
	c)	What are the carotenoids? Write the name of carotenoids found in fish, crustaceans, mammals and mollusks.	4
6.	a)	Write down the major problems of chilled and frozen marine products.	5
	b)	Describe briefly the properties of white and dark muscle of fish.	2
7.		Write down short notes (**any TWO)** on following: i) CLA; (ii) Marine food organisms; (iii) Fat soluble vitamins	3.5 X 2 = 7

Section B

8.	a)	What is flavour? Briefly describe the available compounds responsible for flavour development in fish and other seafood.	4
	b)	What is scombroid poisoning? Describe the causes and prevention of scombroid poisoning.	3
9.	a)	Differentiate between macro- and trace elements with examples.	2
	b)	Briefly describe the sources, functions and daily requirements of the following elements: iron, potassium and copper.	5
10.	a)	Define bioaccumulation. Diagrammatically show how toxins and harmful chemicals enter into the food chain.	4
	b)	Prepare a list of marine biotoxins mentioning their sources.	3
11.	a)	Briefly discuss about the thermal decomposition of fish lipids.	3
	b)	Mention the different fractions of fish lipid and write down their functions.	4
12.	a)	Write down briefly about myosin, paramyosin and actin of fish muscles.	4
	b)	What are the deficiency symptoms of vitamin E in human? Write the roles of vitamin E during processing of fatty fish.	3
13.	a)	Draw and label a typical fish skeletal muscle.	1
	b)	What is free fatty acid? Briefly describe the chemical composition of fish.	5
	c)	What are the objectives of flavour in seafood industry?	1
14.		Write down short notes (**any TWO)** on following: i) Seafood taste; (ii) Fish lipid; (iii) TTX .	3.5 X 2 = 7

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -2 Semester-1, Final Examination' 2019
Course No: **LIM-201 (T)**, Course Title: **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)	Differentiate between Limnology and Ecology.	3
	b)	How will you utilize the knowledge of limnology in fisheries?	4
2.	a)	Define macro and micro nutrients with examples.	2
	b)	Illustrate Nitrogen cycle.	5
3.	a)	What is estuary? Why is it called one of the most productive natural habitats in the world?	3
	b)	Define river. Classify rivers based on the continuity of flow.	3
	c)	Name the major river systems of Bangladesh.	1
4.	a)	Define phytoplankton.	1
	b)	Briefly describe the seasonal succession of phytoplankton.	6
5.	a)	How eutrophication is created?	2
	b)	Differentiate between eutrophic and oligotrophic waterbodies.	3
	c)	Write down the prevention and control measures of eutrophication.	2
6.	a)	Write down the importance of zooplankton in fisheries.	2
	b)	Describe briefly life cycle of Chironimidae.	5
7.	a)	What are the major groups of zooplankton? Give two examples from each.	2
	b)	Illustrate the reproduction cycle of Rotifers.	5

Section B

8.	a)	Define biological productivity of inland waters.	2
	b)	Describe the causal factors responsible for fluctuation of biological productivity.	3
	c)	"Knowledge on Limnology is essential for successful aquaculture."- why?	2
9.	a)	What are the sources of river water?	2
	b)	Why is Halda river called "Natural gene bank for IMCs"?	3
	c)	Write a short note on Kaptai lake.	2
10.	a)	Define biogeochemical cycle.	2
	b)	Discuss nitrogen and phosphorus as limiting factors.	2
	c)	Describe carbon cycle.	3
11.	a)	What do you mean by algal blooms?	1
	b)	What are the potential sources of algal blooms?	3
	c)	Discuss briefly different types of algal toxins commonly found in waterbody.	3
12.	a)	What do you mean by secondary production?	2
	b)	Discuss the factors responsible for fluctuations of secondary production.	5
13.	a)	Differentiate among the three suborders of free living freshwater Copepoda.	2
	b)	Discuss reproduction of copepods.	5
14.	a)	Define periphyton with examples. Explain their role in fisheries.	3
	b)	Explain the life cycle of cladocerans.	4

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2018
Course No: **201 (T)**, Course Title: **Fish Nutrition (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 nutrients?	1
	b)	Nutrients play an important role in commercial aquaculture-explain.	6
2.	a)	What are the factors affecting amino acid requirement in fish?	1
	b)	Describe the dose response curve used to determine quantitative amino acid requirement.	6
3.	a)	What is energy metabolism?	1
	b)	Describe the partitioning of biological energy.	4
	c)	What are the factors affecting energy requirements in fish?	2
4.	a)	Classify polysaccharides.	1
	b)	Write down the functions of carbohydrates.	2
	c)	Briefly explain carbohydrate digestibility in fish.	4
5.	a)	Write in brief nutritional disorders in fish.	5
	b)	How will you minimize the nutritional disorders in fish?	2
6.	a)	Define and classify vitamin.	2
	b)	Write down the sources and functions of two fat soluble vitamins.	5
7.	Write short note on any two of the following:		3.5×2=7
	a)	Crude fibre; b) Cholesterol; c) ANPU.	

Section B

8.	a)	Define fat and oil.	1
	b)	Classify unsaturated fatty acids.	2
	c)	Marine and cold water fishes require highly unsaturated fatty acids. Explain.	4
9.	a)	What is meant by SDA?	1
	b)	Write in brief energy balance equation in fish.	6
10.	a)	Define digestion. What are the factors affecting the rate of digestion?	2
	b)	Briefly describe the protein digestion in fish.	5
11.	a)	Differentiate between apparent nutrient digestibility and true nutrient digestibility.	2
	b)	Briefly describe digestibility determination by indirect method.	5
12.	a)	Classify proteins with examples.	2
	b)	Write down the functions of proteins.	2
	c)	What do you know about amino acid metabolism?	3
13.	a)	Distinguish between digestive fluid and enzyme.	2
	b)	Illustrate the major pathways of carbohydrate metabolism.	5
14.	Write short notes on any two of the followings:		3.5×2=7
	a)	Microbial digestion ; b) Fatty acid biosynthesis ; c) Protein enriched fish feed ingredients.	

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -02 Semester-01, Final Examination' 2018
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 is Marine Biology? How will you apply your knowledge of Marine Biology in the field of marine sector in Bangladesh?	4.0
	b)	How marine archaea differ from bacteria? Write down the general characteristics of marine virus with their ecological roles.	3.0
2.	a)	Why is virus called both living and non-living organism? How marine bacteria contribute in nitrogen fixation and nitrification in marine environment?	3.0
	b)	Are marine protozoans autotrophic or heterotrophic?	1.0
	c)	Discuss the role of foraminifera in marine aquatic environment.	3.0
3.	a)	"Phytoplankton is the base of food chain"- explain the statement.	2.0
	b)	Differentiate between Calcareous and Siliceous phytoplankton	2.0
	c)	Briefly discuss the major factors affecting growth and distribution of phytoplankton in Oceans.	3.0
4.	a)	What is benthic community? Classify marine benthos with their role in EPS formation.	3.0
	b)	"Benthic organisms are important bio-indicator of estuarine system"-Explain the statement.	2.0
	c)	"Neritic zone is the productive oceanic zone"- briefly explain.	2.0
5.	a)	Define Seaweed and Sea grass. What are the potential seaweeds available in Bangladesh coast for commercial culture?	3.0
	b)	What is coral and coral reef? What are the probable causes of coral bleaching?	2.0
	c)	What are the ecological roles of algae in marine environment?	2.0
6.	a)	Describe the life cycle of Aurelia.	4.0
	b)	What is algal Bloom? Give a brief account of its impact on marine environment.	3.0
7.	a)	Why hagfishes are called slime eel?	2.0
	b)	What do you know about Ichthyoplankton?	1.0
	c)	Discuss the physiological mechanism of marine fishes for living in high saline water.	4.0

Section-B

8.	a)	What do you mean by the term "Purging"?	1.0
	b)	What are the different types of cephalopods found in ocean environment?	2.0
	c)	Describe the life cycle of oyster.	4.0
9.	a)	What is "Gemmules" and "Smoking" of sponge?	2.0
	b)	Why scyphozoans are called true jellyfish?	2.0
	c)	Illustrate the life cycle of marine protozoans.	3.0
10.	a)	Why plankton concentration is high in higher latitude and spring season in marine environment?	2.0
	b)	Briefly describe the theories to explain the apparent mutual explosion of the phytoplankton and the zooplankton.	5.0
11.	a)	What are the ecological roles of marine Arthropods?	2.0
	b)	How will you identify a healthy adult *Penaeus monodon*?	2.0
	c)	Illustrate the life cycle of shrimp.	3.0
12.	a)	How does seagrass reproduce? Briefly describe the structure of seagrass.	4.0
	b)	Describe the life cycle of seaweed which show alternation of generation.	3.0
13	a)	List down ten scientific names and common names of commercially important marine fishes of Bangladesh.	3.0
	b)	Describe the life cycle of Hilsha fish in Bangladesh.	4.0
14.	Write short notes on **any two** of the followings:		3.5×2

a) Marine reptiles and birds b) HNLC c) Redtide d) Marine mammals