Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B.Sc. Fisheries (Hons.) Year - 2 Semester - 1 (January-June), Final Examination, 2021
Course No: CAM201 (T), Course Title: Coastal Aquaculture & Mariculture (Theory)
Total Marks: 70; Time: 3 hours

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

Section-A

1.	a.	Write down the regional, national and global importance of coastal aquaculture.	4
	b.	Write down the present status of coastal aquaculture in Bangladesh.	3
2.	a.	Describe in details the general considerations for site selection.	3
	b.	How to set up an aquarium for ornamental fish culture?	4
3.	a.	What is fertilization?	2
	b.	Why a pond bottom is dried before fertilization?	2
	c.	Give a procedure of applying organic fertilizer in a pond.	3
4.	a.	Define water filtration process in a hatchery.	2
	b.	Discuss the function and uses of water filtration in shrimp hatchery.	5
5.	a.	Differentiate between cage and pen culture.	2
	b.	Write down the construction materials of cage culture.	2
	c.	Describe the production process of fish in cage culture.	3
6.	a.	Write down the importance and constrain of prawn culture in Bangladesh.	2
	b.	Explain in details different types of prawn culture techniques in Bangladesh.	5

7. Write short notes on **any 02 (two)** of the following: 3.5x2=7
   i) Larvae culture of *Penaeus monodon*; ii) Culture of Mullet and iii) Culture technique of Yellowtail Fish.

Section B

8.	a.	Write down the habitat and distribution of mud crab.	2
	b.	Explain in details the pond culture techniques of mud crab	5
9.	a.	Write down the feasibility and problems of oyster culture in Bangladesh.	2
	b.	Describe the culture techniques of oyster.	5
10.	a.	Write down the advantages and disadvantages of off-bottom, raft and longline seaweed culture.	2
	b.	Explain in details the production techniques of *Porphyra*.	5
11.	c.	"There are three species of lobsters"- give their scientific name and how do you differentiate them.	2
	d.	Discuss the farming system of lobster.	5
12.	a.	Describe the importance of brood stock management.	2
	b.	Explain in details different methods of brood stock management.	5
13.	a.	Write down the characteristics aspects and importance of flat fish.	2
	b.	Explain in details the culture techniques of seabass culture.	5

14. Write short notes on **any 02 (two)** of the following: 3.5x2=7
    i) Risks and prospects of seaweed culture in Bangladesh; ii) Utilization of seaweed and iii) Culture techniques of Milkfish.

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year-2, Semester-1, Final Examination 2021
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. Illustrates your answer whenever necessary. Figures in the right margin indicate full mark. Use separate answer script for each section.*

Section-A

1. a) Define fish systematics and taxonomy. 2
    b) Briefly describe the importance of studying systematics and evolutionary biology in fisheries study. 3
    c) Why the knowledge on systematics is important for the study of evolutionary biology? 2

2. a) Describe different taxonomic characters with proper examples. 4
    b) 'Meristic characters are more important than morphometric characters in fish population studies and species identification'-justify your answer. 3

3. a) What are the evidences of Darwinism theory? 2
    b) Describe, in brief, Darwin's theory of evolution. 5

4. a) Define phylogenetics. 1
    b) What do you know about phylogenetic tree? 2
    c) Discuss the different constituents of a phylogeny tree with examples. 4

5. a) What do you mean by isolation? 1
    b) What are the different types of isolation? 2
    c) Compare and contrast between different isolation mechanisms. 4

6. a) What do you know about zoogeography of fishes? 2
    b) Mention the zoogeographical regions of marine fishes in the world. 2
    c) Describe the characteristics of the temperate region mentioning its common fish fauna. 3

7. Write down short notes on **any two (02)** of the following: 3.5×2 =7
    a) Law of priority; b) Homonyms; c) Biological species concept and d) Genetic drift

Section-B

8. a) Define species, sub-species and family. 2
    b) What are the differences between sub-species and sibling-species? 2
    c) Describe the Linnaean hierarchy with example. 3

9. a) 'Systematics provides a basis for biodiversity conservation priorities'-explain. 2
    b) Enlist the key criteria for taxonomic categories. 2
    c) Differentiate between the following pairs: race and variety; sympatric species and allopatric species. 3

10. a) How to write scientific name of a fish? 2
    b) Why nomenclature may change? 3
    c) Enlist the demerits of using common name. 2

11. a) Define phylogeny and cladistics. 2
    b) How you will construct a phylogenetic tree for different groups of fishes? 3
    c) Write the basic assumptions of cladistics. 2

12. a) What do you know about chemical and organic evolution? 2
    b) State and explain the main features of the Weismann's 'Germ plasm theory'. 5

13. a) Define speciation. 1
    b) What are the forces of speciation? 2
    c) Briefly describe the patterns of speciation. 4

14. a) Differentiate taxon and category with proper examples. 2
    b) Distinguish between the following pairs of terms - i. polytypic species and monotypic species; ii. classification and identification and iii) ICBN and ICZN 5

Chattogram Veterinary and Animal Sciences University, Chattogram
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B. Sc. Fisheries (Hons.) Year-2, Semester-1, Final Examination 2021
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)	Define limnology.	2
	b)	How you will utilize the knowledge of limnology in fisheries?	5
2.	a)	'Halda river is called pure gene bank for IMCs'- justify.	2
	b)	Write down the significance of Halda river in the fisheries aspect of Bangladesh.	2
	c)	Mention the ongoing threats of Halda river and provide possible suggestions to overcome those threats.	3
3.	a)	Define lake.	1
	b)	Describe briefly the origin of lake basins.	6
4.	a)	What do you mean by biogeochemical cycle?	2
	b)	Describe briefly the nitrogen cycle in water body.	5
5.	a)	Define primary production and name the organisms are responsible for it.	2
	b)	Differentiate between GPP and NPP.	2
	c)	Describe the seasonal succession of phytoplankton.	3
6.	a)	Write down the significant role of zooplankton in fisheries.	2
	b)	How do you enhance the production of zooplankton in fish ponds?	3
	c)	Describe the feeding mechanism of rotifer.	2
7.	a)	'Benthos acts as biological indicators'- explain this statement.	2
	b)	Write down the role of benthic organism in fish production.	3
	c)	Compare and contrast between Chironomids and mosquitoes.	2

Section B

8.	a)	'Haor is known as inland sea'-explain this statement.	2
	b)	Write down the significance of Tanguar haor in fisheries sector.	3
	c)	Mention some factors responsible for declining biodiversity in Tanguar haor.	2
9.	a)	'Reclamation of derelict water bodies is impossible without limnological knowledge'-justify.	2
	b)	Differentiate between swamps and marshes.	2
	c)	Classify pond based on origin of basin.	3
10.	a)	What do you mean by secondary production?	2
	b)	Discuss the factors responsible for fluctuations of secondary production.	5
11.	a)	Differentiate between eutrophic and oligotrophic lakes.	3
	b)	Write down the control and preventive measures of eutrophication.	4
12.	a)	Define Cyclomorphosis.	2
	b)	Describe Cyclomorphosis in zooplankton with necessary figure.	3
	c)	Write down the biological significance of Cyclomorphosis in aquatic ecosystems.	2
13.	a)	Elaborate your understanding on the interrelation between phytoplankton and zooplankton in an aquatic environment.	3
	b)	Illustrate the reproduction of Cladocerans.	4
14.	a)	'Periphyton serves as an indicator of water quality'- explain.	3
	b)	Write down the importance of Chironomids larvae in aquaculture ponds.	4

*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)	Prepare a list of endangered aquatic species of Bangladesh.	3
	b)	Write down the general uses of seaweed collected from the coastal belt of Bangladesh.	4
2.	a)	Differentiate shellfish from mollusks.	3
	b)	Write down the present status of commercially important mollusks available in Bangladesh.	4
3.	a)	Differentiate between fats and oils.	2
	b)	Briefly describe the role of lipids in fish quality and processability.	2
	c)	Diagrammatically show how lipids are broken down to be digested and absorbed in human body.	3
4.	a)	Briefly discuss the available forms, source, functions, daily requirement and deficiency signs of vitamin A and D.	5
	b)	"Hypervitaminosis takes place in case of fat soluble vitamins rather than water soluble vitamins"- justify the statement.	2
5.	a)	Discuss in brief the health implications of CLA.	2
	b)	Write down the safety rules for CLA supplements.	2
	c)	Briefly describe the beneficial effects of Omega-6 fatty acids.	3
6.	a)	What do you mean by bioaccumulation? Diagrammatically show how toxins and harmful chemicals enter into the food chain.	3
	b)	Write down the causative agents, symptoms and preventive methods of PSP, ASP and DSP.	4
7.	a)	Discuss the mechanism of muscle contraction of fish.	3
	b)	Briefly discuss the muscle development and growth in fish at different stages of fish.	4

Section-B

8.	a)	"Fish and shellfishes are more perishable compared to other foodstuffs"- justify your answer.	2
	b)	Mention the common name and scientific name of six commercially important shrimp species of Bangladesh.	2
	c)	Do you think seaweed culture would be feasible in Bangladesh?	3
9.	a)	Differentiate bioaccumulation from biomagnification.	3
	b)	Briefly describe the mechanism of TTX bioaccumulation in fish and shellfish.	4
10.	a)	Mention the names of different enzymes and their functions in fish body.	2
	b)	Differentiate between macro and trace elements with examples.	2
	c)	Write down the general characteristics of sarcoplasmic and myofibrillar protein.	3
11.	a)	Differentiate between taste and flavor. Enumerate the flavor compounds of fish and seafood.	4
	b)	How NPN compounds contribute to the taste and spoilage of seafood?	3
12.	a)	What do you mean by carotenoid? Write the name of carotenoids found in fish, crustaceans, mammals and mollusks.	4
	b)	Write in brief the properties of white and dark muscles.	3
13.	a)	What is histamine poisoning? How does it take place? How can you prevent histamine poisoning?	4
	b)	How can you correlate rancidity and vitamin E in seafood?	3
14.		a) Caviar; b) Phospholipids; and c) Stroma protein.	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 2021
Course No: MBI-201 (T), Course Title: Marine Biology (Theory)
Full 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) Write down the scopes of marine biology in Bangladesh? — 2
   b) Sea creatures include all domains of life- explain. — 2
   c) What is viral shunt? Write down the role of virus in marine climate change. — 3

2. a) How osmoregulation in marine bony fishes is different from cartilaginous fishes? — 3
   b) What is hermaproditism in fish? — 1
   c) How the term ovoviviparity' conflicts with parity and larval nutrition mode in fishes. — 3

3. a) Differentiate saltmarsh, sea grass and seaweed. — 2
   b) Write down the common and scientific name of five (05) commercially important seaweeds available in Bangladesh. — 2
   c) Explain alteration of generations in seaweed. — 3

4. a) When and why shark perform buccal pumping? — 2
   b) How does shark maintain buoyancy? — 2
   c) Enlist the common name and scientific name of three of each: sharks, rays and skates of the Bay of Bengal. — 3

5. a) Write down the major groups of zooplankton with examples. — 2
   b) Explain the types and causes of cyclomorphosis in marine zooplankton. — 3
   c) What is DVM in marine zooplankton. — 2

6. a) What is marine snow? — 2
   b) How does water ventilation occur through bioturbation? — 2
   c) Classify marine benthos according to type, size and location. — 3

7. Write short notes on any 02 (two) of the following: — 3.5 × 2 = 7
   a) Horseshoe crab; b) Viviparity in shark; c) Migration patterns in marine fish and d) Red tide

Section-B

8. a) Mention the major groups of marine fishes with their recognizable characters and examples. — 3
   b) Write down the importance of icthyoplankton study. — 2
   c) What ecosystem services salt marsh do? — 2

9. a) Draw the external morphology of a barnacle. — 2
   b) Illustrate the life cycle of a mussel. — 3
   c) Write down the scientific name of two of each groups: clam, oyster and mussel. — 2

10. a) Classify echinoderms with two main characters and examples of each group. — 2
    b) What do you know about crown-of–thorns? — 2
    c) Draw and explain the evolutionary line of diverse larval form development in echinoderm. — 3

11. a) Classify marine plankton with two recognizable characters and an example of each group. — 4
    c) How does dinoflagellate reproduce? — 3

12. a) Write down the common and scientific name of a marine crocodile found in Bangladesh. — 1
    b) Enlist marine turtle species that are reported from the territorial waters of Bangladesh. — 2
    c) Draw and describe the life cycle of a turtle species found in Saint Martin's Island. — 4

13. a) Write down the characteristics and examples of the major groups of marine mammals. — 3
    b) Enlist sea mammals available in the Bay of Bengal — 2
    c) What is the status of mammal conservation in Bangladesh? — 2

14. Write short notes on any 02 (two) of the following: — 3.5 × 2 = 7
    a) HNLC; b) The Voyage of challenger; c) Bacterioplankton and d) Intertidal plants

*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 are the important graphs for representing a frequency distribution of quantitative data? Discuss histogram and ogive curve. **3**

    b) Define and distinguish the measurement of scale with an example: i) Nominal and ordinal scale ii) Ratio and interval scale. **4**

2. a) You conducted a hypothesis test to compare the mean weight (in gm) of fishes among three lakes and find a non-significant result. However, the true population means of fish weight (in gm) do significantly vary between lakes. Which type of error has occurred? Explain your answer. **3**

    b) A manufacture has developed a new fishing line, which he claims has a mean breaking strength of 15 kgs with a standard deviation of 0.5 kgs. However, you believe that the mean breaking strength should be less than 15 kgs. To test your belief, a random sample of 50 lines has been tested. The critical region is defined to be $\bar{x} < 14.9$. What would you conclude about your belief after previously a suitable test? **4**

3. a) The weight (in gm) of the following fishes collected from Fishery Ghat Chattogram are as follows- 776, 580, 539, 648, 538, 891, 673, 783, 571, 627, 727, 867, 1042, 804, 832, 764. Find any two measures of central tendency and comment. **4**

    b) Explain normal distribution considering the variable "Length of fishes". Illustrate the shape of that distribution. **3**

4. a) How will you explain the empirical rule? What is Z-score? **4**

    b) Suppose, you are given a data set on "Fish species" described as "Flat " or "Round". Which graph you would use to display this data? **3**

5. a) A fish biologist goes out and samples a population of 321 tuna. A total of 109 tuna were marked and released. Identify the population, sample and experimental unit from the above study. **3**

    b) Explain types of variable with an example each. **4**

6. a) Defend the statement- "Coefficient of variation is the best measure of dispersion". **3**

    b) Data on the age (in years) of fish retailers in Riazuddin Bazar is as follows- 35, 31, 45, 57, 48, 37, 49, 52, 46, 55. Compute any two measures of dispersion and comment. **4**

Section-B

7. a) What is Bernoulli trial? Define Bionomial distribution. State some of its important properties. **3**

    b) Define normal distribution. Convert the normal variable into a standard normal variable and obtain its mean and variance. **4**

8. a) Define factor, treatment and experimental unit with a suitable example in the context of the analysis of variance. **3**

    b) Compare between CRD and RBD. Which one is the best design of experiment? Why? **4**

9. a) A study was carried out during January to December 2009 in Bhola district by Karim et al. (2015) on age and growth of male Hilsa. The data is as follows- **3**

Age(years)	0.24	0.34	0.46	0.61	0.79	1.03	1.40	2.22
Mean Body weight (gm)	18.33	43.70	85.74	148.69	236.84	354.46	505.88	695.38

    i) Fit a regression line of age on mean body weight of male Hilsa.
    ii) What would be the mean body weight of Hilsa when age is 2.50 years.

    b) Explain coefficient of determination when the value is 0.80. **4**

10. **a)** Suppose you sampled the weight of Vetki fishes from Kazirdewri bazaar and found $\gamma_1 = 0.70$ and $\gamma 2 = 0.43$. Draw the distribution and comment on the skewness and kurtosis of the distribution. **3**

b) In the above data, suppose, $Q_2 = 3.4$ kgs. Interpret the result. **4**

11. **a)** Explain level of significance, rejection region and non-rejection region for the test of hypothesis. **3**

b) Mention the test statistic to test- **4**
   i) Independence of attributes
   ii) Compare the means of two independent populations when population standard deviation is unknown.

12. **a)** A sample of 400 fish retailers (200 from Riazuddin bazar and 200 from Karnofuli bazar) was chosen across Chattogram to determine information concerning hygienic issues. " Do you notice a sign of unhygienic environment in the bazar"- this question was asked. Of the 200 retailers from Riazuddin bazaar, 120 answered "Yes". Of the 200 retailers from Karnofuli bazaar 90 answered "Yes". Construct a contingency table and calculate the marginal and joint probabilities. **4**

b) Given the respondent is a retailer from Riazuddin bazaar, calculate the probability that the person notices signs of unhygienic issues in the bazaar. **3**