

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

Year -02, Semester-01, Final Examination' 2014
Course No: FNU-201(T), Course Title: **Fish Nutrition**
Total Marks: 70, Time: 3 hour

Answer any 05 (five) question from each section

Section-A

1. a) What is meant by fish nutrition? 2.0
b) "A good aquaculturist should have sufficient knowledge in fish nutrition"- Justify. 5.0
2. a) Name the essential amino acids for fish with their requirement. 2.0
b) How do you determine the essentiality of an amino acid? 5.0
3. a) Define lipids with their major classification and prime functions. 4.0
b) Give at least one example of n-3, n-6 and n-9 fatty acids with short and notation and chemical structure. 3.0
4. a) What is carbohydrate? 2.0
b) Write down the functions of carbohydrates. 5.0
5. a) Define vitamins. Classify it with their internationally approved names. 3.0
b) Write down the function of water and fat soluble vitamins. 4.0
6. a) What is energy? 1.0
b) Give a schematic diagram of energy allocation in fish. 2.0
c) Describe the factors regulating energy requirement of fish. 4.0
7. Write short note on following topics: (any two) 2×3.5= 7.0
a) Hypervitaminosis;
b) Essential fatty acids;
c) β -oxidation ; and
d) Protein-energy ratio.

Section-B

8. a) Mention the EFA deficiency signs in fishes in a tabular form. 2.0
b) Describe the factors influencing fatty acid composition in fish. 5.0
9. a) Define digestion. 1.0
b) Describe different types of absorption in fish. 2.5
c) Describe the proteolytic enzymes activities in feed digestion. 3.5
10. a) Differentiate between apparent nutrient digestibility and true nutrient digestibility. 1.0
b) Cite the digestive fluids and enzymes secreted in teleosts with their functions in a tabular form. 6.0
11. a) Define digestibility. 2.0
b) How do you estimate digestibility by indirect method? 5.0
12. a) Describe the dose response curve used to determine quantitative amino acid requirement in fish. 7.0
13. a) Classify minerals in respect to their requirement by fish. 3.0
b) Write down the functions of any two of the following minerals (a) Calcium (b) Phosphorus (c) Selenium 4.0
14. Write short note on following topics: (any two) 2×3.5= 7.0
a) Phospholipids;
b) Crude fibre;
c) Energy balance equation; and
d) SDA.

Chittagong Veterinary and Animal Sciences University, Chittagong
B. Sc. Fisheries (Hons.) Year -02, Semester-01, Final Examination' 2014
Course No: BIL-201 (T), Course Title: **Biological Limnology**
Total Marks: 70, Time: 3 hours

Answer any 5 (five) questions from each section. Draw and label whenever necessary.
The figures in the margin indicate full mark.

Section-A

1. (a) Define Limnology. Classify Limnology. 2
(b) Write down the major processes of the origin of lake and pond basins. 5
2. (a) Define lake. Write down the name of lakes of Bangladesh. 2
(b) Briefly describe the Kaptai Lake and the Caspian Sea. 5
3. (a) What are the sources of river? 2
(b) Discuss the source and course of any two of the following rivers: 5
i) the Brahmaputra, ii) the Meghna, and iii) the Nile
4. (a) What is biogeochemical cycle? 2
(b) Discuss any one of the following: i) Phosphorus cycle, and ii) Sulphur Cycle 5
5. (a) Define primary production? 2
(b) Briefly describe the determination procedure of primary production using light-dark method. 5
6. (a) Classify freshwater zooplankton based on their taxonomy. 2
(b) Write down the reproduction cycle of Rotifer. 5
7. (a) Define river. 2
(b) Discuss the significance of river. 5

Section-B

8. (a) What do you mean by eutrophication. 2
(b) Write down the types, harmful effects and control measures of eutrophication. 5
9. (a) Draw the anatomical features of a rotifer. 2
(b) Define periphyton. Write the significance of periphyton in aquaculture. 5
10. (a) Draw the major river systems in Bangladesh. 2
(b) Write down the significance of Halda river in the fisheries resources of Bangladesh. 5
11. (a) Write down the importance of calcium and iron. 2
(b) Describe nitrogen cycle in aquaculture. 5
12. (a) Why is primary production essential to aquatic life? 2
(b) Briefly describe the factors affecting primary production. 5
13. (a) Classify copepods. 2
(b) Write down the distinguishing features among different copepods. 5
14. (a) What do you mean by algal blooms? 2
(b) Describe briefly the cyanobacterial algal blooms. 5

Chittagong Veterinary and Animal Sciences University, Chittagong

Faculty of Fisheries

Year -02, Semester-01, Final Examination

Course No: MBI-201(T), Course Title: Marine Biology

Total Marks: 70, Time: 3 hour

Answer any 05 (five) question from each section

Section-A

1. a) What is Marine Biology? Relate between Marine Biology and Biological Oceanography. 2.5
b) Differentiate between Cartilaginous and Bony fish. 2.0
c) "Body shape of a fish is directly related to its life style"- describe with necessary supportings. 2.5
2. a) What does the word 'Corona' means? 1.0
b) Briefly describe the reproduction method of rotifer. 3.0
c) Write down the characteristics of major groups of Zooplankton. 3.0
3. a) What is ichthyoplankton? 1.5
b) Write down the developmental stages of ichthyoplankton. 2.5
c) Mention the methods of ichthyoplankton collection. 3.0
4. a) Write down the scientific name of five species of Oyster available in Bangladesh. 2.0
b) Describe the life cycle of Oyster with diagram. 3.0
c) What do you know about 'Purging' and 'Fouling' of Oyster? 2.0
5. a) What is 'Ram Ventilation'? 2.0
b) "Shark tail pattern differ according to species"- Describe with example. 2.0
c) How the digestive system of shark does differ from Bony Fishes? 3.0
6. a) Define benthic community. Classify the marine benthic community with example. 3.0
b) How do we investigate the benthos? 2.0
c) Why the benthoses are important to the biological community of the sea? 2.0
7. Write short note on following topics: (any two) 3.5×2= 7.0
a) Red tide;
b) Cyclomorphosis of Zooplankton;
c) Phytoplankton-Zooplankton relationship; and
d) Life cycle of *Scylla serrata*

Section-B

8. a) Classify plankton on the basis of size and life cycle. 2.5
b) Which factors mostly effect on phytoplankton distribution in marine environment? 2.0
c) What does HNLC refers? Write down the hypotheses on HNLC regions. 2.5
9. a) What is seasonal succession of plankton? 1.5
b) Describe the patterns of phytoplankton seasonality with figure. 3.0
c) Write down the relation of plankton to fish production. 2.5
10. a) What is HAB's? 1.5
b) Write down the mechanisms of harm to different organisms by HAB's. 2.5
c) Mention the causative organisms, toxin characters and symptoms of PSP and CFP. 3.0
11. a) What is "Ampullae of Lorenzini"? 1.0
b) Which mechanisms help the huge shark to be buoyant? 2.0
c) How male and female *Penaeus* can be distinguished? 1.5
d) Draw and label the different stages of life cycle of *Penaeus monodon*. 2.5
12. a) What is seasonal polymorphism? 1.0
b) Describe the life cycle of Copepod with figure. 3.0
c) What is DVM of zooplankton? What are the reasons for DVM? 3.0
13. a) Differentiate between seaweed and seagrass. 2.0
b) Write down the importance of seaweed. 2.0
c) Describe the life cycle of seaweeds. 3.0
14. Write short note on following topics: (any two) 3.5×2= 7.0
a) Brooding pattern in shark;
b) Anthropogenic impacts on the seas;
c) Fishing grounds of BoB; and
d) Phases of Phytoplankton bloom

Chittagong Veterinary and Animal Sciences University, Chittagong
B. Sc. Fisheries (Hons.) Year -2, Semester-1, Final Examination, 2014

Course No: STA-201(T); Course Title: Statistics (T)

Total Marks: 70; Time: 3 hour

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

Section-A

1. a) Define Population and sample with an example each. Prove $\sum (y_i - \bar{y}) = 0$ 3
 b) State the nature of variables of the followings: Economic status of a worker in a Fishery ghat, Weight of a mullet, body temperature of a shell fish, No. of deaths of fishes of a pond, Monthly salary of an employee in a fish processing plant, Age of a Tilapia, Color of a shrimp. 4

2. a) What are the most commonly used measures of central tendency? Prove, for two positive non zero quantities $AM \geq GM \geq HM$. 4
 b) Suppose there are 150 workers in a fish processing plant. The monthly incomes (in taka), of 10 workers are selected randomly from the plant: 3449, 3447, 3468, 3493, 3572, 3516, 3502, 3492, 3446, and 3475. Find the mean, median and mode with necessary comments. 3

3. a) What do you mean by a standardized normal variate? Show that for a standardized normal variable, mean is zero and variance is one. 3
 b) In a pond of certain area, a disease has spread to such an extent that 1% of its fishes are infected with the disease. Suppose a sample of 5 fishes is selected at random from the pond. What is the probability that 4
 i. exactly one fish out of 5 is infected? $\frac{1}{5} \quad P(2)$
 ii. at most one fish out of 5 is infected? $P(0) + P(1)$
 iii. none of 5 is infected $P(0)$

4. a) Define Karl Pearson's Correlation coefficient with an example. 2
 b) The following data refers to the weight and market value of fishes from a trawler in a fishery ghat. 5
- | | | | | | |
|--------------------------|----|----|----|----|----|
| Weight of fishes (in Kg) | 5 | 2 | 3 | 4 | 1 |
| Market value (in taka) | 38 | 22 | 33 | 36 | 16 |
- Calculate correlation coefficient and comment.

5. a) What is scatter diagram? Show $r = -1$ and $r = 0$ with the help of scatter diagram. 2
 b) You are given the following information on age (x, years) and blood pressure (y, mm Hg) of 10 fishermen in Cox's bazar area: 3
- | | | | |
|-----------------------------|---------------------------------|------------------------------|-----------------------------------|
| $\sum_{i=1}^{10} x_i = 429$ | $\sum_{i=1}^{10} x_i^2 = 19277$ | $\sum_{i=1}^{10} y_i = 1265$ | $\sum_{i=1}^{10} x_i y_i = 54915$ |
|-----------------------------|---------------------------------|------------------------------|-----------------------------------|
- i. Find regression coefficient of y on x;
 ii. Obtain correlation co-efficient, r, for $\sum_{i=1}^{10} y_i^2 = 1,60,675$ and use all information given above and comment
 iii. Find the value of co-efficient of determination by using the value of r found in (ii) and interpret the value.

6. a) Define treatment, block, experimental unit and yield with an example each. 3
 b) Distinguish between CRD and RBD, Set an example in the Fisheries field where we can consider RBD instead of CRD? Under what circumstances RBD will turn into CRD? 4

7. a) Define Types of error and Power of a test. 4
 b) Given a sample of 40 Seabass with an arithmetic mean of weight 8 kg. Does this herd belong to a population with mean 2 kg and standard deviation 1 kg? (Use 5% level of significance) 3

Section-B

8. a) Define a frequency distribution. Describe the important steps in constructing a frequency distribution from raw data 4
 b) The following frequency distribution shows the length of Hilsha fish caught on a certain day at a certain point of the Padma. 3

Class interval (Length in cm)	No. of fishes caught	Class in (Length in cm)	No. of fishes caught
25-30	39	45-50	15
30-35	45	50-55	8
35-40	52	55-60	6
40-45	75		

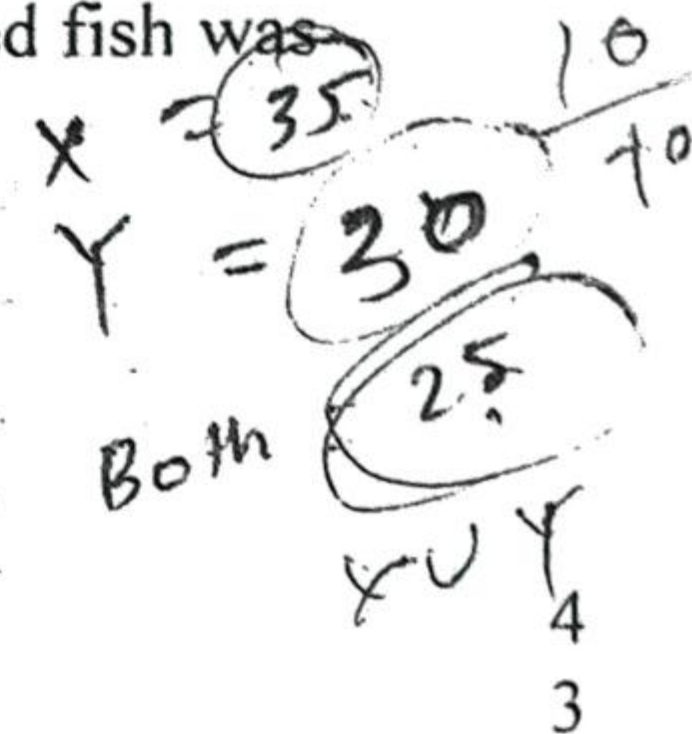
- Point out the following issues with the help of the above frequency table
- The mid value of the 4th class interval;
 - Lower limit of the modal class;
 - Upper limit of the median class;
 - Size of the 5th class interval;
 - Number of fishes having length below 45 cm;
 - Relative frequency of the class 30-35

9. a) Explain with an example what is meant by dispersion of a set of data? Mention its various relative and absolute measures. Which measures do you think the best and why?
- b) An analysis of monthly wages paid to the workers of two fishery farm A and B belonging to the same company gives the following results:

	Farm A	Farm B
No. of workers	500	600
Average monthly wages	\$185	\$175
Standard deviation of distribution of wages	9	10

Compute coefficient of variation (CV) for two farms separately and comment which farm is more consistent.

10. a) What is joint and Conditional probability?
- b) In a sample of 40 Tilapia 35 were fed Feed X and 30 were fed Feed Y and 25 both the feeds. A Tilapia is selected randomly from the sample. What is the probability that the selected fish was feed
- Only feed X.
 - Feed X and Y.
 - Only one feed
 - What is the conditional probability of Feed X given Y?

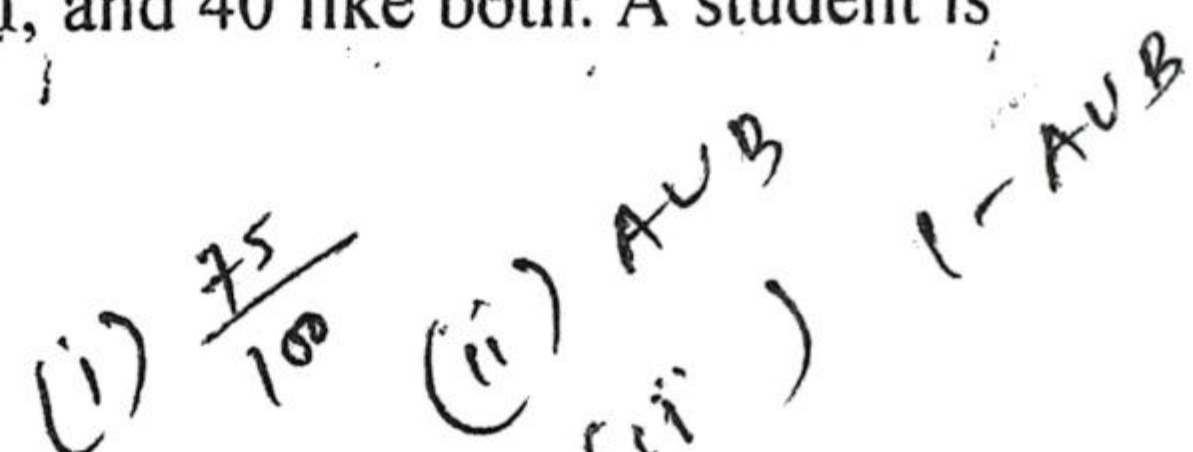


11. a) Mention the various steps involved in conducting hypothesis testing
- b) The following table shows the result of inoculation against a disease:

Inoculation	Disease attack	
	Not attacked	Attacked
Inoculated	415	15
Non-inoculated	350	20

Examine the effectiveness of inoculation in controlling susceptibility to cholera. Use $\alpha=0.05$. (Given $\chi^2_{1, 0.05} = 3.84$, $\chi^2_{2, 0.05} = 5.99$, $\chi^2_{3, 0.05} = 7.81$)

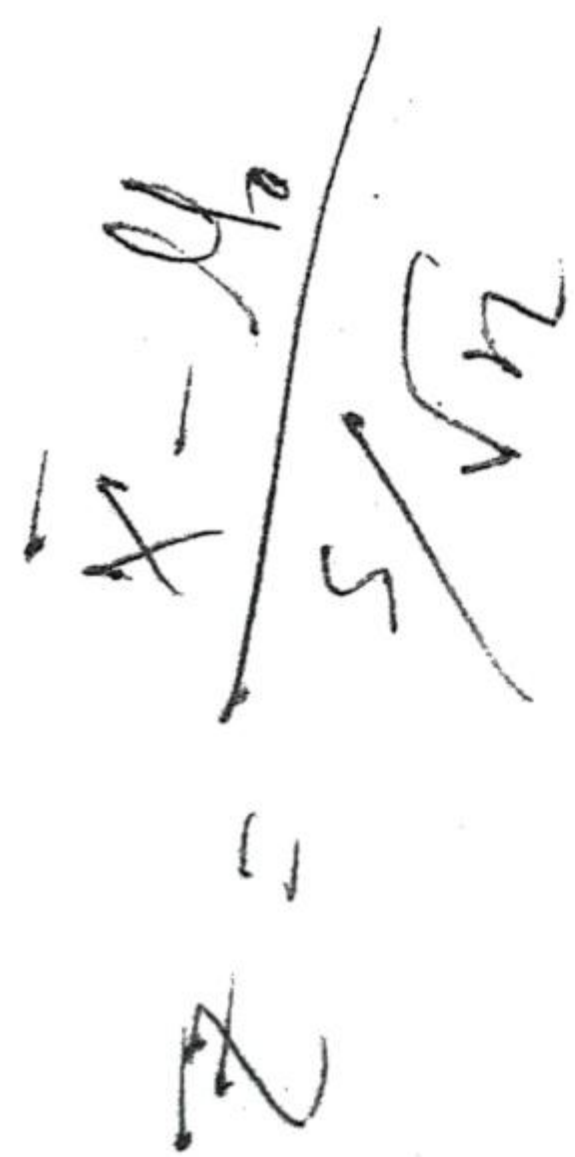
12. a) Define with example the term: sample space, equally likely event, impossible event, and probability of an event.
- b) Suppose there are two varieties of fish (say sea fish and non-sea fish). In a class of 100 students in a fisheries faculty of CVASU, 75 like variety -I, 50 like variety -II, and 40 like both. A student is selected at random. Find the probability that the selected student:
- like variety -I;
 - like at least one variety;
 - like none of the variety-I, and variety-II.



13. a) Define (i) Level of significance (ii) two tailed test (iii) null hypothesis (iv) test statistic.
- b) A fish seller claims that the average of his fishes is not less than 10 kg. A random sample of 50 large fishes gave an average weight of 10.95 kg with a standard deviation of 0.21 kg. Could we accept the claim of seller at 5% level of significance? (Given two tailed critical value of Z at 5% level, $Z_{0.05/2} = 1.96$ one tailed value of Z at 5% level, $Z_{0.05} = 1.64$)

14. Write short note on following topics: (any two)

- Rank correlation (when ranks are equal)
- Skewness and Kurtosis
- Principles of experimental design



3.5 × 2 = 7

Chittagong Veterinary and Animal Sciences University, Chittagong

Faculty of Fisheries

Year -02, Semester-01, Final Examination' 2014

Course No: **MFC-201(T)**, Course Title: **Marine Food Chemistry**

Total Marks: 70, Time: 3 hour

Answer any 05 (five) questions from each section

Section-A

1. a) Define primary, secondary, tertiary and quaternary structure of protein. 4.0
b) What do you know about myofibrillar protein? How do they differ from connective tissue protein? 3.0
2. a) Write down briefly how rigor can affect the quality of fish/ fillets. 4.0
b) Do you consider fish as the most perishable food items among all flesh products? Justify. 3.0
3. a) Define flavor. 0.5
b) Classify food flavor and give example of each group. 4.0
c) Describe the role of Vitamin-E on human health. 2.5
4. a) Define carotenoids. 0.5
b) Describe in short- "Carotenoids present in marine animals". 5.0
c) Why retinol and vitamin-K are essential for human body? 1.5
5. a) Prepare a list of different nitrogenous and volatile compounds responsible for flavor in fish. 4.0
b) What is the role of NPN to the taste and spoilage of fish? 3.0
6. a) What is Ciguatera fish poisoning? 2.0
b) Name different groups of shellfish poisoning. Write down their causative agents and responses to human being. 5.0
7. a) Write down the major problems that occur in chilled and frozen marine products. 5.0
b) Explain why hypervitaminosis occurs only for fat soluble vitamins but not for water soluble ones? 2.0

Section-B

8. a) Classify marine organisms. Give two examples of each group. 3.5
b) Write down the present status of seaweeds in Bangladesh. 3.0
c) What is by-catch? 0.5
9. a) Define free fatty acid. What are the essential fatty acids? 1.0
b) Describe the role of ω -3 in cardiovascular system and neurological benefits. 5.0
c) What do you understand by EPA and DHA? 1.0
10. a) What do you mean by PUFA? 0.5
b) Write down the benefits of PUFA on human health. 1.5
c) Describe briefly "Lipid metabolism". 5.0
11. a) Write down the names of essential amino acids for adults. 2.0
b) Describe the benefits of ω -6 fatty acid on allergies, diabetic neuropathy and osteoporosis. 5.0
12. a) Define lipid oxidation. What are factors that influence the rate of lipid oxidation in foods? 4.0
b) What are the means of preventing lipid oxidation in fish? 3.0
13. a) What is CLA? 0.5
b) Discuss briefly the health implication of CLA. 4.5
c) Mention the factors influences the CLA content in food. 2.0
14. a) Discuss briefly the commercial use of whale. 4.0
b) Write down the fat triglyceride short hand formula. 2.0
c) Write a short note on crab of the Bay of Bengal. 1.0

Chittagong Veterinary and Animal Sciences University, Chittagong

B. Sc. Fisheries (Hons.) Year -02, Semester-01, Final Examination' 2014

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

Total Marks: 70, Time: 3 hours

**Answer any 5 (five) questions from each section. Draw and label whenever necessary.
The figures in the margin indicate full mark.**

Section-A

1. (a) Define Limnology. Classify Limnology. 2
(b) Write down the major processes of the origin of lake and pond basins. 5
2. (a) Define lake. Write down the name of lakes of Bangladesh. 2
(b) Briefly describe the Kaptai Lake and the Caspian Sea. 5
3. (a) What are the sources of river? 2
(b) Discuss the source and course of any two of the following rivers: 5
i) the Brahmaputra, ii) the Meghna, and iii) the Nile
4. (a) What is biogeochemical cycle? 2
(b) Discuss any one of the following: i) Phosphorus cycle, and ii) Sulphur Cycle 5
5. (a) Define primary production? 2
(b) Briefly describe the determination procedure of primary production using light-dark method. 5
6. (a) Classify freshwater zooplankton based on their taxonomy. 2
(b) Write down the reproduction cycle of Rotifer. 5
7. (a) Define river. 2
(b) Discuss the significance of river. 5

Section-B

8. (a) What do you mean by eutrophication. 2
(b) Write down the types, harmful effects and control measures of eutrophication. 5
9. (a) Draw the anatomical features of a rotifer. 2
(b) Define periphyton. Write the significance of periphyton in aquaculture. 5
10. (a) Draw the major river systems in Bangladesh. 2
(b) Write down the significance of Halda river in the fisheries resources of Bangladesh. 5
11. (a) Write down the importance of calcium and iron. 2
(b) Describe nitrogen cycle in aquaculture. 5
12. (a) Why is primary production essential to aquatic life? 2
(b) Briefly describe the factors affecting primary production. 5
13. (a) Classify copepods. 2
(b) Write down the distinguishing features among different copepods. 5
14. (a) What do you mean by algal blooms? 2
(b) Describe briefly the cyanobacterial algal blooms. 5

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) Hydroacoustics 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 Synonymy 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 <i>Octopus</i> and <i>Sepia</i> up to species. | 3 |
| | b) Compare and contrast the general features of <i>Octopus</i> and <i>Sepia</i> | 4 |