Chittagong Veterinary and Animal Sciences University, Chittagong

Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, Jan-Jun semester, Final Exam/2017

Course No.: BAA- **501 (**T**),** Course Title: **Biology of Aquatic Animals**

Time: 2hr, Full Marks: 40

Answer **any five (05)** from the following. Figure in the right margins indicates full marks. Splits answers is not acceptable.

1.	a.	What do you mean by biology of fish?	1.0
	b.	Write down the significance of studying biology of fishes.	3.0
	c.	Prioritize the economic significance of shelfishes in Bangladesh.	4.0
2.	a.	Characterize the breeding behavior of *Mugil cephalus*.	4.0
	b.	Prepare a comparative statement about the life history events in *Salmo salar* and *Anguilla bengalensis*.	4.0
3.	a.	What do you mean by hibernation and aestivation?	2.0
	b.	How you will differentiate between male and female frog?	2.0
	c.	Summarize the life cycle events of Dolphin.	4.0
4.	a.	What do you mean by spat, veliger, PL and zoea?	2.0
	b.	How you will differentiate between male and female crab?	2.0
	c.	Draw and label a typical crustacea.	2.0
	d.	Why culture of Lobster is quite difficult in Bangladesh perspective?-Defend against your answer.	2.0
5.	a.	What do you mean by protandry, protogyny and hermaphrodism?	2.0
	b.	Briefly describe the pearl formation mechanisms in Oyster.	4.0
	c.	Assess the feasibility of mollusks culture in Bangladesh.	2.0
6.	a.	What do you understand by adaptation and response?	2.0
	b.	Summarize the adaptive changes found in fishes in response to drought.	3.0
	c.	How marinewater fish maintain osmoregutarory balance?	3.0
7.	a.	What do you mean by migration with their types?	2.0
	b.	Identify the causes for fish migration?	2.0
	c.	Ennumerate the migratory behavior of a diadromous fish.	4.0

Chittagong Veterinary and Animal Sciences University, Chittagong

Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology: Jan- Jun Semester, Final Exam/17

Course No & Title.: RDA- 501 (T), Research Design and Genetic Data Analysis

Total Marks-40, Time: 2 hours

*Answer any **05 (five)** question. Figures in the right margin indicate full mark.*

1. a) What is an experiment? Describe the basic principles of an experimental design. 3.0

   b) Explain different experimental design with example. 5.0

2. a) What are the different types of data? Give examples of different types of data in respect of fisheries science. 4.0

   b) What are the importance of standard deviation and standard error in any research? Explain why random distribution is the core assumption for any parametric statistical analysis. 4.0

3. a) What do you know about ANOVA? 2.0

   b) How will you compute one-way ANOVA? 6.0

4. a) Mention the steps of phylogenetic tree construction. 2.0

   b) Explain Unweighted Pair Group Method with Arithmatic Mean (UPGMA) with an example as a method of phylogenetic tree construction. 6.0

5. a) What do you mean by linkage disequilibrium? What are the reasons of linkage disequilibrium? 4.0

   b) Explain linkage disequilibrium with example. 4.0

6. a) What is Chi-Square test? How will you calculate Chi-Square (χ^2) statistic? 3.0

   b) A researcher prepare a table with four cells labeled as Rohu, katla, mrigel, kalbasu on the basis of prior knowledge of Halda river community. Spawn samples are collected from different locations of halda river. It is assumed that spawn of all species are randomly dispersed. The observed frequencies of rohu, katla, mrigel, and kalbasu are 1320, 1680, 1160, and 1080 respectively. Calculate if the distribution of frequencies between the categories is homogenous? (Tabulate value-11.34 with 3d.f). 5.0

7. a) What are the advantages of ANOVA? 1.0

   b) The following table shows the weight (g) of a fish species in four different situations (using four different feeding regimes, FR). Determine if the mean weight of the four groups significantly differs ($F_{3,36}$=2.88; at 5% level of significance). 7.0

Wt. (g) with FR1	Wt. (g) with FR2	Wt. (g) with FR3	Wt. (g) with FR4
130	122	134	108
127	128	129	112
124	125	133	113
126	127	136	109
132	133	130	116
129	123	138	108
125	126	127	107
136	122	128	110
120	129	132	114
123	119	135	115

Chittagong Veterinary and Animal Sciences University, Chittagong
Department of Fish Biology and Biotechnology
MS in Fish Biology and Biotechnology; Jan- Jun Semester, Final Exam/17

Course No & Title.: FGE- 501 (T), Fish Genetic Engineering

Total Marks-40, Time: 2 hours

*Answer **any 05 (five)** question. Figures in the right margin indicate full mark.*

1.	a)	Discuss the prospects of genetic engineering in fisheries.	5.0
	b)	Explain fish as model animal for genetic engineering and biotechnology.	3.0
2.	a)	How will you extract and quantify DNA in laboratory?	5.0
	b)	Explain any two labeling technique of nucleic acid.	3.0
3.	a)	What do you mean by In-Situ Hybridization?	1.0
	b)	Write the principle of Fluorescence In Situ Hybridization (FISH).	3.0
	c)	What are the procedural steps of Genomic In Situ Hybridization (GISH).	4.0
4.	a)	How will you create recombinant DNA?	5.0
	b)	Explain the technique of rDNA detection.	3.0
5.	a)	Describe mass gene transfer methods.	3.0
	b)	Make a plan for transgenic fish production to integrate a noble gene.	5.0
6.	a)	Draw a diagram showing the components of a protein coding gene.	2.0
	b)	Discuss the regulatory elements of a eukaryotic gene.	6.0
7.	a)	Write the basic steps of gene cloning.	2.0
	b)	How will you produce and screen cDNA library?	6.0

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MS in Fish Biology and Biotechnology, Jan-Jun/Final Exam/2017

Course No.: FEN- **501 (T)**, Course Title: **Fish Endocrinology**

Time: 2hr, Full Marks: 40

Answer **any five (05)** from the following. Figure in the right margins indicates full marks. Splits answers is not acceptable.

1.	a.	What do you mean by endocrinology and endocrine system?	2.0
	b.	"Endocrinology has an immense scope in medical science"-Justify the statement.	2.0
	c.	Differentiate between endocrine and exocrine glands?	2.0
	d.	Outline the position of different endocrine glands found in fishes in a diagram.	2.0
2.	a.	Why do you think hormone is essentials for every activity in life?	2.0
	b.	Compare and contrast the endocrine system between fish and human.	4.0
	c.	"Hormone is called the chemical messenger molecule in the body"- prove the statement.	2.0
3.	a.	"Androgen is a steriod hormone"- Justify your answer.	2.0
	b.	Construct a diagram showing the synthesis of steroid hormone in the body.	4.0
	c.	Negative feedback can control the secretion of excess amount of hormone- explain with diagram.	2.0
4.	a.	Pituitary is called the master gland- Why?	2.0
	b.	What are the hormones are released from the anterior pituitary and How it is controlled?	2.0
	c.	The pancreas is both an endocrine gland and a digestive organ-explain.	2.0
	d.	"Growth hormone is reponsible for all the developmental activities in an animal"- Criticize the statement.	2.0
5.	a.	"A hormone can be a neurotransmitter"-Defend against your answer.	2.0
	b.	"Dopamin is both an inhibatory and excitatory neurotransmitter"- Discuss the statement	2.0
	c.	Summarize the neural regulation mechanisms by neurosecretory cells.	4.0
6.	a.	HPG axis controls the reproduction and development in an animal- How you will interpret the statement?	3.0
	b.	How FSH is controlled in female gonads?	2.0
	c.	Why do you think testosterone is a vital hormone in male?	3.0
7.	a.	Differentiate between synchronus and asynchronous ovarian development.	2.0
	b.	Integrate the maturation of oocyte and related hormonal control in a diagram.	4.0
	c.	How egg-yolk and egg-precursor protein is synthesized?	2.0

Chittagong Veterinary and Animal Sciences University, Chittagong
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MS in Fish Biology and Biotechnology; Jan- Jun Semester, Final Exam/17

Course No & Title.: **PCG- 501 (T), Fish Population and Conservation Genetics**

Total Marks-40, Time: 2 hours

*Answer any **05 (five)** question. Figures in the right margin indicate full mark.*

1.	a)	What o you mean by Hardy Weinberg Equilibrium? What are the assumptions underlying HWE?	3.0
	b)	Explain the HWE law with example from fish.	5.0
2.	a)	What is genetic marker? Make a list of genetic marker widely used in fisheries research.	3.0
	b)	Explain the production method of RFLP with examples.	5.0
3.	a)	Write down the principle of electrophoresis.	2.0
	b)	Discuss the steps for protein separation with diagram.	6.0
4.	a)	Write the principle of microsatellite.	2.0
	b)	Make a comparison between RFLP, RAPD and Microsatellite marker.	3.0
	c)	What are the factors affecting migration of nucleic acids during agarose gel electrophoresis?	3.0
5.	a)	What is genetic drift? Mention the relationship with inbreeding number.	3.0
	b)	Explain the effect of genetic drift with examples.	5.0
6.	a)	What do you mean by natural hybridization and gene introgression in fishes?	2.0
	b)	What are the factors promoting natural hybridization in fishes?	2.0
	c)	Explain the negative impacts of natural hybridization in fishes.	4.0
7.	a)	What do you mean by genetic distance? What are the bases of genetic distance?	2.0
	b)	Explain the Nei's standard genetic distance method as a measure of genetic distance.	6.0

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MS in Fish Biology and Biotechnology, Jan-Jun, Fianl Exam/2017

Course No.: AFP- **501 (T),** Course Title: **Advance Fish Physiology**

Time: 2 hrs, Full Marks: 40

Answer **any five (05)** from the following. Figure in the right margins indicates full marks. Splits answers is not acceptable.

1.	a.	What do you mean by physiology and how it is differ from anatomy?	2.0
	b.	Ennumerate the application of physiological knowledge in fisheries science.	3.0
	c.	What are the legal aspects you should consider while using anesthesia in fishes?	3.0
2.	a.	What do you understand by metabolism?	1.0
	b.	Establish the relationship between metabolism and energy.	2.0
	c.	Diagrammatically show the energy metabolism process in fish.	3.0
	d.	What are the factors affects the energy metabolism in fish.	2.0
3.	a.	Write down the component of fish circulatory system with their functions.	3.0
	b.	Compare and contrast the circulatory mechanisms of fish and human.	5.0
4.	a.	Contrast between anesthesia and sedation.	2.0
	b.	Chemicals and non chemicals anesthsis, which one is more useful in transporting fish? Justify against your answer.	3.0
	c.	Summarize the application anesthesia in fisheries sectors.	3.0
5.	a.	"Fish production is hampared due to effects of stress"- Argue with your answer.	2.0
	b.	Make a list of different stressors causing stress to fish.	2.0
	c.	Diagrammatically show the fishes response to stress.	2.0
	d.	How you can minimize the stress in culture fisheries.	2.0
6.	a.	Define ration. How it is related to fish production?	2.0
	b.	Outline the different techniques for measuring growth in fishes.	4.0
	c.	Summarize the effects of temperature on the growth of fishes.	2.0
7.	a.	What do you mean by concurrent and countercurrent exchange system? differentiate between them.	3.0
	b.	Briefly describe the gill ventillation mechanisms in fish.	5.0