Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017
Course No: **PAH-401 (T)**, Course Title: **Population Approaches in Aquatic Animal Health and Production (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 epidemiology? Discuss the role of epidemiology in aquatic animal health.	1+3
	b)	What is descriptive and analytic study of epidemiology? What are the scopes of epidemiologic studies in the measures of diseases in the aquatic animals?	1+2
2.	a)	What do you know about transboundary disease? What are the factors important for regulating the transboundary disease?	1+3
	b)	Discuss the impacts of transboundary diseases on aquaculture and fisheries sector.	3.0
3.	a)	What do you know about the import risk analysis? What are the aims and goal of import risk analysis in fisheries?	3.0
	b)	List down the principle of import risk analysis? What are the steps you need to follow for conducting the import risk analysis?	2+2
4.	a)	What do you understand by sampling and sampling frame?	2.0
	b)	Discuss about the different techniques of probability sampling for epidemiological study.	3.0
	c)	Briefly discuss how you can minimize the sampling error during disease surveillance.	2.0
5.	a)	What do you know about emerging disease? What are the factors related to the emergence of an infectious diseases?	1+1
	b)	What are the relationship between climate change and disease emergence in fisheries?	2.0
	c)	Discuss how you can assess the impact of emerging disease at the population level in fisheries sector.	3.0
6.	a)	What do you know about the biosecurity in fisheries? Discuss the objectives and importance of biosecurity in fisheries.	1+3
	b)	Discuss about the fundamental principles of implementing biosecurity in fisheries.	3.0
7.	a)	Define GIS, RS and GPS. How do all of these are integrated in a single use.	4.0
	b)	What is information system and gDB? Which information is necessary for a database to be gDB?	3.0

Section-B

8	a)	What do you know about disease outbreak and outbreak investigation in fisheries?	2.0
	b)	Discuss the steps you need to follow during disease outbreak investigation in fisheries?	3.0
	c)	What are the importance of outbreak investigation in fisheries?	2.0
9.	a)	What do you know about disease prevalence? How the disease prevalence can be increased and decreased?	2.5
	b)	What are the types of disease prevalence?	1.5
	c)	Discuss about the different methods that can be used to investigate the disease prevalence in fisheries.	3.0
10.	a)	What do you know about disease reporting?	1.0
	b)	What are the factors responsible for affecting disease reporting in fisheries?	2.0
	c)	Discuss how the routes of spreading disease are identified in fisheries.	4.0
11.	a)	What are the difference between hazard and risk?	2.0
	b)	What do you know about the risk assessment and uncertainty in risk assessment?	2.0
	c)	Write down the names of three types of risk assessment in disease epidemiology. Briefly discuss these three types of risk assessment.	3.0
12.	a)	What do you know quarantine and quarantine protocol for aquatic animals?	2.0
	b)	List down the major international codes and guide lines for aquatic animal health and movement of aquatic animals?	2.0
	c)	Discuss about the standards of an approved quarantine premises for aquatic animals.	3.0
13.	a)	What is geospatial analysis? Briefly describe spatial analysis of raster datasets.	1+2
	b)	What do you mean by Geoid, Ellipsoid, Map Projections and Datum?	4.0
14.	Write short notes on **any two** of the followings		3.5×2

a) Scope of GIS technology in fisheries b) Non-probability sampling c) Disease frequency

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year – 04 Semester – 01, Final Examination 2017
Course No: **ABT-401 (T),** Course Title: **Algal Biotechnology (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 algin?	2
	b)	Discuss briefly the importance of studying "Algal Biotechnology" in Fisheries.	3
	c)	"Algae are not classified as plant"-explain.	2
2.	a)	What do you understand by micro algae and macro algae?	2
	b)	Write down the extraction procedure of algin from algae.	3
	c)	Discuss the characteristics and application of align.	2
3.	a)	Enlist four extraction techniques used for bioactive compound isolation.	1
	b)	How can algae derived products help our land and environment?	3
	c)	"Zoosterols are better than Phytosterols"- do you agree with the statement, why?	3
4.	a)	"Microalgae can be a biological control of pathogenic microbes" – Justify your answer.	2
	b)	Write down the applications of macroalgae as nutraceuticals.	2
	c)	Diagrammatically show biosynthesis process of EPA and DHA.	3
5.	a)	List down 6 (six) species that are potential for bioethanol production.	3
	b)	What are the advantages of algal biofuel over corn biofuel?	2
	c)	How microalgae prevent oxidative damage of cell?	2
6.	a)	Write in brief factors need to be considered in selecting algae for biofuels?	2
	b)	How can algae help to reduce greenhouse gases?	2
	c)	What are the reasons behind all the recent interest in making fuels from algae?	3
7.	a)	What is schistosomiasis? How does microalgae prevent schistosomiasis?	3
	b)	Illustrate photobioreactor system of micro-algae culture with their advantages and disadvantages.	4

Section-B

8.	a)	What do you mean by phycoremediation?	1
	b)	Discuss the factors limiting microalgal growth with their optimum level.	3
	c)	Briefly discuss the uses of microalgae in mitigation of CO_2 emissions.	3
9.	a)	What is bio-toxin?	2
	b)	Write down the source organism of PSP and DSP.	2
	c)	What are the uses of algae as food additives?	3
10.	a)	What is agar?	1
	b)	Write down the characteristics and significance of agar.	4
	c)	How agar is isolated from marine algae?	2
11.	a)	Design a microalgae cultivation system.	2
	b)	Illustrate biodiesel production system from microalgae.	3
	c)	Briefly discuss screening criteria of Microalgae.	2
12.	a)	What do you mean by 'Blue Nutraceutical'?	2
	b)	Write down the importance of microalgae in pigmentation of marine organism.	2
	c)	Differentiate natural antioxidant with synthetic antioxidant.	3
13.	a)	Enlist toxic compounds found in algae.	1
	b)	"Algal toxins are not always harmful for mankind"- Do you agree or not? Justify your answer.	3
	c)	What will happen if certain area of Bay of Bengal is affected by Brevetoxins? Propose possible solution to overcome this problem.	3
14.	a)	What do you understand by harmful algae?	2
	b)	Discuss the usefulness of microalgae in human body.	2
	c)	Write down the constraints and future prospects of Algal Biotechnology.	3

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017
Course No: **FEX-401 (T)**, Course Title: **Fisheries Extension (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) Discuss the functions of Agricultural Extension. 3.0
   b) "Extension is helping people to help themselves"-justify. 4.0

2. a) Enlist the principles of Agricultural Extension. Briefly describe any one of them. 1+2
   b) Compare between formal education and extension education. 4.0

3. a) Define communication. List the elements of communication process. 1+1
   b) Identify the qualities of a good communicator in fisheries extension work. 5.0

4. a) Differentiate between teaching aids and teaching methods. 3.0
   b) Choose the criteria for selecting and use of appropriate extension teaching methods. 4.0

5. a) Define learning. State the law of readiness with implication in fisheries extension work. 0.5+3.5
   b) Outline the special features of adult learning. 3.0

6. Write short notes on following:
   a) Method demonstration of cage culture
   b) Objectives of Department of Fisheries (DoF)

Section-B

7. a) Write in brief the role of DoF as an extension organization. 3.5
   b) Illustrate "POSDCORB" 3.5

8. a) "Good leaders are made not born"-judge the statement. 3.5
   b) Interpret the ways of organizing and developing local leaders for fisheries extension work. 3.5

9. a) What do you mean by innovation decision process? State types of innovation decision process. 0.5+2.5
   b) Illustrate "decision tree". 4

10. Describe scope of rural women in fisheries for livelihood improvement. 7

11. a) Define extension program planning. 1.0
    b) Analyze the steps for developing fisheries extension program. 6.0

12. a) Differentiate between monitoring and evaluation. 4.0
    b) State the importance of project evaluation. 3.0

Chittagong Veterinary and Animal Sciences University

Faculty of Fisheries

B. Sc. Fisheries (Hons.), 4th Year, 1st Semester, Final Examination, 2017

Course No. **QCF-401,** Course Title: **Quality Control of Fish and Fishery Products**

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. Individual part of a question should be answered together.*

Section-A

1.	a)	Explain different concepts of quality.	2.0
	b)	"Quality is about improvement rather than control"-explain.	2.0
	c)	Do you think quality control is very important in fish processing industry? Discuss briefly.	3.0
2.	a)	What do you mean by standard and specification?	2.0
	b)	"Implementing ISO is advantageous"- explain.	2.0
	c)	Outline the quality management principles of ISO 9000 series.	3.0
3.	a)	What is traceability? List down its major components.	1+1
	b)	Do you think traceability implementation is important in Bangladesh? Justify your answer.	2.0
	c)	Explain the traceability framework for shrimp value chain in Bangladesh.	3.0
4.	a)	Distinguish between food infection and food intoxication.	1.0
	b)	Write in brief the factors influencing the intrinsic quality of fish.	2.5
	c)	Explain briefly assessment of fish quality by determining organoleptic aspects of defect points of ice stored fish.	3.5
5.	a)	Explain the organization of Competent Authority of fish and fishery products of Bangladesh for official control.	4.5
	b)	Write down the prevention or control measures of fish quality deterioration	2.5
6.	a)	Write down briefly FDA Eight Key sanitation conditions and practices in food processing establishment	4.0
	b)	Describe briefly any two sanitation conditions and practices in food processing establishment	3.0
7.	a)	Discuss the underlying causes of running quality control programme in a fish processing industry.	3.5
	b)	Write in brief the general provisions of GMP required in fish processing establishment.	3.5

Section-B

8.	a)	Describe the preliminary steps in developing a HACCP plan.	3.5
	b)	Write in brief CCPs can be steps in the process flow where hazards can be prevented, eliminated and reduced to acceptable level.	3.5
9.	a)	What is critical limit? Why critical limit is very important? Give an examples of single hazard with single CCP, single hazard with multiple CCPs, and multiple hazards with a single CCP in a process flow of a fishery product.	3.5
	b)	Discuss the control measures of pathogenic bacteria, chemicals, parasites and physical hazards in fishery products.	3.5
10.	a)	Categorize hazards with examples.	1.0
	b)	Identify species and process related hazards in fish fishery products.	3.0
	c)	Prepare a risk based hazard analysis worksheet for IQF *Hilsha (Tenualosa ilisha)* fish in receiving where allergen and histamine are potential hazards.	3.0
11.	a)	Briefly describe the microbiological quality deterioration in salted fish.	3.0
	b)	Write down briefly two biochemical methods to assess the quality of fish.	4.0
12.	a)	Do you think safe handling of fish is necessary? Discuss the issues need to consider for safe handling of fish.	1+3
	b)	Discuss the humane methods for killing of fish and shellfish.	3.0
13.	a)	Why inducing anesthetics in fish is necessary? Mention the desirable features of an ideal anesthetic.	1+1
	b)	Suppose you have to transport 100 kg *Labeo rohita* fry from Mymensingh to Chittagong. Which method of transportation you will choose and why? Plan pre-requisite activities and total procedure for the safe transportation of fish.	1+4
14.		Write short notes on the followings (**Any two**):	3.5×2
		a) End product specifications of fishery products b) SOP of a fish processing establishment	
		c) Attitudes towards marine animals. d) CODEX	

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017
Course No: **MRE-401 (T)**, Course Title: **Mangrove Resources (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 mangrove vegetation? Describe the ecological and physiological characteristics of mangroves.	1+3
	b)	Describe the factors responsible for the development of mangroves.	3.0
2.	a)	"Sundarban mangrove is the unique mangrove ecosystem"- Explain the statement.	2.0
	b)	"Mangroves act as buffer zone" - Justify the statement.	2.0
	c)	Discuss the biodiversity status of Sundarban mangrove wetland.	3.0
3.	a)	"Mangroves play a significant role as nursery ground of different aquatic animals" – Explain the statement.	2.0
	b)	"Microbes play a vital role in nutrient recycling in a mangrove system and contribute to its high productivity" – Explain the statement.	2.0
	c)	Discuss how mangrove contribute carbon and nitrogen fixation.	3.0
4.	a)	Mention the key features of mangrove fisheries?	2.0
	b)	Why UNESCO declared the Sundarban mangrove forest as "World Heritage" in 1999?	2.0
	c)	What are the hydro-ecological factors affecting the fisheries diversity in mangrove area?	3.0
5.	a)	What is detritus? How mangrove forest contributes detritus formation in the ecosystem?	2.0
	b)	Draw the trophic level and mention the value of mangroves in an aquatic system.	3.0
	c)	Classify the ecological zonation of mangrove forest basted on salinity.	2.0
6.	a)	What do you mean by co-management of mangrove forest? Mention the objectives of mangrove co-management.	1+2
	b)	Discuss the management framework for Sundarban Reserve Forest (SRF).	4.0
7.	Write short notes on **any two** of the followings: a) Mangrove ecotourism b) Blue carbon c) Organic matter d) UNESCO World Heritage site		3.5×2

Section-B

8.	a)	Sundarban mangrove forests act as natural barrier to protect the South-Western part of Bangladesh. Justify the statement.	2.0
	b)	Briefly discuss the present issues of Sundarban mangrove fisheries of Bangladesh.	2.0
	c)	Formulate your own plan to address the present issues of Sundarban mangrove fisheries of Bangladesh.	3.0
9.	a)	Various natural and human induced threats are destructing the mangrove forests of Bangladesh. What are these natural and human induced threats to mangrove vegetation?	2.0
	b)	Describe the reasons for mangrove destruction in Bangladesh.	2.0
	c)	Indiscriminate expansion of shrimp farming is the major cause of Chakaria Sundarban destruction of Bangladesh –Justify the statement.	3.0
10.	a)	Define mangrove ecology.	1.0
	b)	Briefly describe the global distribution of mangroves with specific notes on Bangladesh.	4.0
	c)	Describe the ecological and economic importance of mangroves.	2.0
11.	a)	Differentiate between red mangroves and black mangroves.	2.0
	b)	Briefly mention the ecological zonation of SRF with name of characteristics species.	2.0
	c)	Discuss about the dominant species in the saline zone of mangrove areas.	3.0
12.	a)	What do you know about mangrove restoration and regeneration? Why mangrove restoration and regeneration is important for Bangladesh?	2+2
	b)	Formulate your own plan for restoration of Chakaria Sundarban mangrove forest of Bangladesh.	3.0
13.	a)	Explain ecologically critical area and protected area. What are the treats to protected areas of Bangladesh?	2+2
	b)	Briefly discuss about the programs for natural resources conservation of Bangladesh.	3.0
14.	Write short notes on **any two** of the followings a) Aquaculture and mangrove b) Root and Rhizome c) Function of pneumatophore		3.5×2

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017
Course No: **FRP-401(T)**, Course Title: **Fisheries Research and Planning (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 research process. Why was Barnett's general schema developed?	3.0
	b)	Sketch Barnett's general schema of the research process.	4.0
2.	a)	Compare census and sampling with example.	2.0
	b)	Mention the importance to conceptualize a model in research process?	2.0
	c)	What does the method of data analysis in a research depend on?	3.0
3.	a)	What is standard error?	1.0
	b)	Why do you check research findings against the original model?	2.0
	c)	Describe briefly an example of observational studies.	4.0
4.	a)	Compare between project monitoring and evaluation.	2.0
	b)	Which one is the most important step in project evaluation? - Explain.	2.0
	c)	Draw a standard normal curve along with its properties.	3.0
5.	a)	Define sampling and sampling error.	3.0
	b)	Distinguish between standard deviation and standard error.	4.0
6.	a)	Describe the purpose of the section 'Materials and Methods'.	1.0
	b)	Write down ten commandments of good writing.	2.0
	c)	Explain Z_α notation with example.	4.0
7.	a)	What do you know about 'Student's t-distribution'?	1.0
	b)	Give an interpretation for general empirical rule for normally distributed random variables.	2.0
	c)	The recommended adequate intake (RAI) of calcium for adults is 5.6 g per week. The mean calcium intake of 40 poor peoples near CVASU is 751.4 mg/day with a standard deviation of 259.6 mg. Now perform a hypothesis test at 5% significance level (critical value -1.645) to decide whether the poor gets less than RAI of 5.6 g/week	4.0

Section-B

8.	a)	Depict research process in a general way.	2.0
	b)	"Research generates new knowledge"- what is meant by new here?	3.0
	c)	State Chebychev's rule. What does it interpret for a standard deviation of 1.4?	2.0
9.	a)	Describe the sources of confusion in an experiment with minimizing measures.	4.0
	b)	The mean weight of all harvested tilapia individuals of an aquaculture pond is 0.256 kg with a standard deviation of 44 g. Obtain the weight of a randomly selected fish given that there is 99.74% probability the weight remains within.	3.0
10.	a)	What are the suggested rules for a good 'introduction' of a research paper?	3.0
	b)	Give an example of model reference write up of a scientific paper.	1.0
	c)	Illustrate a flowchart for choosing correct hypothesis-testing procedure for one population mean.	3.0
11.	a)	Explain 'predictor' and 'response' variables with examples.	1.0
	b)	Why planning in research is mandatory?	3.0
	c)	Compare between 'conference report' and 'meeting abstract'.	3.0
12.	a)	What stands for IMRAD? Define the logic of IMRAD in question form.	2.0
	b)	What are the weaknesses of participatory methods?	2.0
	c)	What do you suggest about a sample for having a size of minimum 30 to estimate population mean?	3.0
13.	a)	Mention some benefits of early consultation with stakeholders in participation.	2.0
	b)	Discuss the several levels of stakeholder participation.	3.0
	c)	What are the purposes of using maps in socio-economic assessment?	2.0
14.	a)	What is a review paper?	1.0
	b)	Define sampling distribution of the mean.	2.0
	c)	Obtain the large-sample confidence interval for a population mean algebraically.	4.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017
Course No: **FEN-401(T)**, Course Title: **Fish Endocrinology (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 endocrine gland and endocrine system? 2.0
   b) Why do you think endocrinology has great scope in biological science? 3.0
   c) Differentiate between endocrine and exocrine glands? 2.0
2. a) What do you mean by chemical messenger? 2.0
   b) Construct a diagram showing the mechanisms hormone release in a fish body. 5.0
3. a) "Pituitary is called the master gland"- Justify your answer. 3.0
   b) What are the hormones produced from the marked areas in pituitary? 4.0

4. a) Outline the position of different endocrine glands found in fishes in a diagram. 2.0
   b) Compare and contrast the endocrine system between fish and human. 5.0
5. a) Construct a diagram showing the synthesis of steroid hormone in the body. 5.0
   b) How does the synthesis of steroids differ from that of peptide hormones? 2.0
6. a) Conclude the changes takes palce in sparmatids during final sperm formation. 4.0
   b) Why do you think testosterone is a vital hormone in male? 3.0
7. Write notes on ***any two (02)*** from the following topics 3.5×2=7.0
   a) Vitellogenesis
   b) Sertoli cell
   c) Adrenal Gland

Section-B

8. a) Why do you think hormone is essentials for every activity in life? 2.0
   b) "Androgen is a steriod hormone"- Justify your answer. 2.0
   c) How G protein works in signal transduction? 3.0
9. a) "Hormone is called the chemical messenger molecule in the body"- prove the statement. 2.0
   b) "Ligand and receptor molecule and interrelated molecule in signal transduction"- Justify. 2.0
   c) How ligand gate ion channel works? 3.0
10. a) "A hormone can be a neurotransmitter"-Defend your answer. 2.0
    b) "Dopamin is both an inhibatory and excitatory neurotransmitter"- Discuss the statement. 2.0
    c) How inhibatory neurotransmitter helps our body? 3.0
11. a) Summarize the neural regulation mechanisms by neurosecretory cells. 3.0
    b) Neuron is a typical cell or not- Establish your opinion. 2.0
    c) Diagrammatically show the different organels of a typical neurons. 2.0
12. a) HPG axis controls the reproduction and development in an animal- interpret the statement? 4.0
    b) How LH and FSH is controlled in male gonads? 3.0
13. a) Differentiate between synchronus and asynchronous ovarian development. 2.0
    b) Integrate the maturation of oocyte and related hormonal control in a diagram. 3.0
    c) How egg-yolk and egg-precursor protein is synthesized? 2.0
14. a) "Growth hormone is reponsible for all the developmental activities in animal"- Criticize the statement. 3.0
    b) How anterior pituitary regulate the thyroid gland? 4.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Faculty of Fisheries

B. Sc. Fisheries (Hons.) Year -04 Semester-01, Final Examination' 2017

Course No: **MGE-401(T)**, Course Title: **Molecular Biology and Genetic Engineering (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 molecular biology and genetic engineering?	2.0
	b)	How will you apply your molecular biotechnological knowledge in fisheries?	5.0
2.	a)	What is PCR?	1.0
	b)	'PCR is commonly used molecular technique'. Justify the statement.	2.0
	c)	Explain the steps of PCR with examples.	4.0
3.	a)	Write the principle of electrophoresis.	2.0
	b)	Make a list of commonly used electrophoresis techniques.	2.0
	c)	Mention the factors affecting migration of nucleic acids during electrophoresis.	1.0
	d)	How will you apply electrophoresis in molecular research in fisheries?	2.0
4.	a)	Define restriction endonuclease.	1.0
	b)	Classify the restriction endocucleases with example of each type.	3.0
	c)	List three restriction endonucleases with their source, recognition and cutting sequence.	3.0
5.	a)	What is microsatellite marker?	1.0
	b)	Write the principle of microsatellite marker.	3.0
	c)	Justify microsatellite marker as the most useful marker in molecular study?	3.0
6.	a)	Define promoter and enhancer.	2.0
	b)	Explain the general features of a eukaryotic gene with diagram.	4.0
	c)	What are the mobile genetic elements in the genome of living organisms?	1.0
7.	a)	What do you know about DNA library?	1.0
	b)	Describe how you will prepare pituitary cDNA library and isolate the Growth Hormone cDNA.	6.0

Section-B

8.	a)	Define DNA fingerprinting?	1.0
	b)	Discuss RAPD as a DNA fingerprinting method.	4.0
	c)	What are the disadvantages of RAPD as a marker?	2.0
9.	a)	What is meant by dominant and co-dominant markers?	2.0
	b)	Make a list of molecular markers widely used in fish genetic study.	2.0
	c)	How will you use molecular markers in genetic study and management of fish population?	3.0
10.	a)	Describe the methods of gene transfer in fish.	6.0
	b)	Why do we need to transfer a large number of DNA copies into a fish egg?	1.0
11.	a)	Mention the steps at which the expression of a gene can be regulated.	3.0
	b)	Discuss how the transcription of a gene is controlled.	4.0
12.	a)	What do you know about operon?	2.0
	b)	Compare between inducible and repressible operon.	3.0
	c)	'Genetic engineering is essential for modern age'-Justify the statement.	2.0
13.	a)	Define GMOs and LMOs.	2.0
	b)	Discuss the biosafety issues of transgenic fish.	5.0
14.		Write short notes on any 02 (Two) of the followings:	3.5×2=7.0
		a) Western blotting b) rDNA c) RFLP d) Exon and intron	

Chattogram Veterinary and Animal Sciences University, Chattogram
Faculty of Fisheries
B. Sc. Fisheries (Hons.) Year -4 Semester-1, Final Examination' 2019
Course No: **MGE-401 (T)**, Course Title: **Molecular Biology and Genetic Engineering (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 molecular biology and biotechnology.	1
	b)	Justify the significance of studying molecular biology and genetic engineering in fisheries.	2
	c)	Explain how the knowledge of molecular biology and genetic engineering can enhance sustainability of Fisheries sector.	4
2.	a)	Describe the functions of restriction endonucleases.	2
	b)	Enlist five restriction endonucleases with their source, cutting site with the indication of number of base cutter and cutting sequences.	5
3.	a)	What is PCR? Write the principle of PCR.	2
	b)	Explain the procedural steps of PCR with example.	5
4.		Discuss in details the construction and screening of cDNA library.	7
5.	a)	What is meant by dominant and co-dominant marker?	2
	b)	Write the principle of RFLP marker. Mention advantages and disadvantages of RFLP marker.	5
6.	a)	What is recombinant DNA? Write the applications of recombinant DNA.	2
	b)	Explain how would you create and screen recombinant DNA.	5
7.	a)	What is blotting? Mention the blotting techniques with their purpose.	2
	b)	Write the principle of Western blotting. Mention its applications.	3
	c)	Differentiate between Southern blotting and Western blotting.	2

Section B

8.	a)	What is molecular marker? Make a list of molecular markers widely used in fish genetic study.	2
	b)	How will you use molecular markers in genetic study and conservation of fish population?	5
9.	a)	Define electrophoresis. Write the principle of gel electrophoresis.	3
	b)	What are the factors affecting migration of nucleic acids during electrophoresis?	2
	c)	Write the functions of agaorose gel, sodium dodecyl sulphate, ethidium bromide in electrophoresis.	2
10.	a)	Differentiate transient transformation from stable transformation of gene.	2
	b)	Explain the methods of bacterial transformation and retroviral transduction.	5
11.	a)	List the artificial methods of DNA transfer.	2
	b)	Describe the principle of electroporation and microinjection with their advantages and disadvantages.	5
12.	a)	Define the following terms: exon; promoter and enhancer.	2
	b)	Illustrate the general features of a eukaryotic protein coding gene.	5
13.	a)	What is meant by gene expression and why regulation of gene expression is necessary?	1
	b)	Mention the steps at which expression of a gene is regulated.	2
	c)	Explain the mechanism of post-transcriptional regulation of gene expression.	4
14.		Write down short notes on any ***02 (Two)*** of the following: i) Mobile genetic elements; ii)) Cloning vectors; iii) Southern blotting	3.5 × 2 = 7