

**Chattogram Veterinary and Animal Sciences University, Chattogram**

**Faculty of Fisheries**

**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**

**Course No: QCF-401 (T), Course Title: Quality Control of Fish and Fishery Products (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) Why does raw fresh fish spoil so quickly? What do you understand about intrinsic quality of fish? Describe the factors affecting the intrinsic quality of raw fresh fish. 4  
b) What are extrinsic quality defects in raw fresh fish? Describe the factors affecting the extrinsic quality of raw fresh fish. 3
2. a) What do you mean by SOP and SCP? Do you think SCP can ensure the safety of fish products properly? - Explain. 4  
b) Define traceability. Discuss briefly the role of traceability to ensure the source detection. 3
3. a) List down the statistical methods commonly used to assess the quality of fishery products. Discuss any two of them. 3  
b) Briefly describe the mechanical, instrumental and physical analytical methods of quality assessment of fishery products. 4
4. a) Explain the major activities of FIQC of Bangladesh. 3  
b) Explain the duties and responsibilities of FIQC inspector. 4
5. a) Ethical issue is important in fisheries sector? -Justify. Discuss briefly the inhuman methods are practiced commercial killing of fish and shellfish. 4  
b) What is potable water? Explain microbiological and chemical standard of water and ice used in the fish processing industry. 3
6. a) What is food safety hazards? How do you classify the food safety hazards with examples? 3  
b) List the pathogenic group of bacteria with examples. List seven principles of HACCP. 4
7. a) What do you know about CODEX? Describe briefly about the quality management principles of ISO 9000 series. 4  
b) Explain the concepts: Quality Control and Quality Assurance. 3

**Section-B**

8. a) What do you know about the functional responsibilities of quality program? Schematically present the organogram of Fish Inspection and Quality Control. 4  
b) Discuss the major training programs conducted by FIQC to different stakeholders. 3
9. a) What are the pre-requisites for issuing health certificate of shrimp for export? 3  
b) What kind of quality loss occur in chilled and frozen fishery products? Explain. 4
10. a) Differentiate between standard and specification. Explain the standard specification of frozen fish. 3  
b) What is CCP? Give examples where CCP can be prevented, eliminated and reduced to be acceptable level. 4
11. a) What do you mean by raw material quality? Differentiate <sup>among</sup> ~~between~~ quality attributes, deterioration and spoilage. 3  
b) Briefly describe the finished product quality. 4
12. a) Why care should be taken in developing a product flow chart? Explain. 3  
b) Develop a process flow chart for raw frozen shrimp (Farmed *P. monodon*) for HACCP plan. 4
13. a) Discuss the factors need to be considered during handling of live fish. 3  
b) Write in brief the quality problems cured fishery products of Bangladesh. 4
14. Write down short notes (any TWO) of the following: 3.5 x 2 = 7  
a) GMP; b) Quality attributes; and c) Critical limit.

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**Faculty of Fisheries**  
**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**  
**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) | What is research?  | 1 |
|    | b) | Why does research need?  | 2 |
|    | c) | List down the characteristics of research.                       | 4 |
| 2. | a) | Outline the steps of research process.                           | 2 |
|    | b) | Discuss the different steps of research process.                 | 5 |
| 3. | a) | Name the types of research usually carried out in life sciences. | 3 |
|    | b) | 'Research is a completed process' - amplify the statement.       | 4 |
| 4. | a) | Why are project plans important?                                 | 2 |
|    | b) | Briefly discuss the keys to successful project planning.         | 5 |
| 5. | a) | What is socio-economic assessment? Mention its types.            | 3 |
|    | b) | State the goals and objectives of a socio-economic study.        | 4 |
| 6. | a) | What is data interpretation?                                     | 1 |
|    | b) | Why data interpretation is important?                            | 2 |
|    | c) | Discuss the steps of data interpretation.                        | 4 |
| 7. | a) | Why do we need secondary data?                                   | 2 |
|    | b) | List down the different methods of field data collection.        | 2 |
|    | c) | Distinguish between primary and secondary data with example.     | 3 |

**Section B**

- |     |    |   |   |
|-----|----|---|---|
| 8.  | a) | What do you mean by experiment?   | 1 |
|     | b) | Point out the research verbs to use in aims and objectives.   | 2 |
|     | c) | Distinguish between research activities and objectives with example.                                      | 4 |
| 9.  | a) | What stands for SWOT?   | 1 |
|     | b) | Distinguish between primary and secondary research.   | 2 |
|     | c) | "Each of your research objectives should be SMART"-explain.   | 4 |
| 10. | a) | What is applied research?   | 2 |
|     | b) | Write down the benefits of conducting applied research.   | 2 |
|     | c) | How do you determine when to use basic vs. applied research?  | 3 |
| 11. | a) | Which questions do you need to answer to evaluate project success?  | 2 |
|     | b) | Summarize the essential elements of a project plan.   | 2 |
|     | c) | Sketch a Gantt chart with example.  | 3 |
| 12. | a) | Differentiate between quantitative and qualitative research.  | 2 |
|     | b) | Distinguish between project monitoring and evaluation.  | 2 |
|     | c) | Which steps should you consider during planning the field data collection?                                | 3 |
| 13. | a) | Who will be the corresponding author?   | 1 |
|     | b) | What should you consider to write an ideal title for your article?  | 2 |
|     | c) | Give example of an ideal abstract mentioning the elements.  | 4 |
| 14. | a) | What is plagiarism?   | 1 |
|     | b) | What will you consider in regards to authorship and originality of manuscripts submitted for publication? | 3 |
|     | c) | Breakdown the information includes in a reference with example of each.                                   | 3 |

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**Faculty of Fisheries**

**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**

**Course No: FGB-401 (T), Course Title: Fish Genetic Engineering and Biotechnology (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 Genetic Engineering' and 'Biotechnology'. 1  
b) "Genetic engineering is highly important in the fisheries sector of Bangladesh"- validate the statement. 3  
c) Enlist the characters of fish for genetic manipulations. Select the best characters for the genetic modification with appropriate justification. 3
2. a) Why recombination of DNA molecule is important in genetic engineering? 2  
b) Compare between blunt end and sticky end with example. 2  
c) Narrate briefly the controversies associated with the use of recombinant DNA technology. 3
3. a) What do you mean by blotting? Enlist three commonly used blotting membrane. 2  
b) Compare and contrast between Southern-, Northern- and Western blotting. 5
4. a) What is genetic marker? 1  
b) "RAPD is an excellent marker for providing useful information on identifying, characterizing and structuring fish population"- argue the statement with reason. 4  
c) Mention the application and limitations of microsatellite marker. 2
5. a) What do you understand by transgene and transgenesis? 1  
b) Prepare a plan for producing transgenic *Labeo rohita* for double growth gene. 6
6. a) Briefly explain the principle of electrophoresis. 3  
b) Differentiate between agarose gel electrophoresis and polyacrylamide gel electrophoresis. 2  
c) Mention two major limitations of agarose gel electrophoresis. 2
7. Write down short notes on **any two (02)** of the following: 3.5×2=7  
a) SDS-PAGE; b) Microinjection; c) DNA cloning in bacteria; and d) AFLP marker

**Section-B**

8. a) Differentiate recombinant DNA from DNA. 2  
b) Discuss the steps of creating recombinant DNA. 5
9. a) "DNA library is the store house for the genes"- justify. 1  
b) Differentiate between cDNA library and genomic DNA library. 2  
c) Construct a cDNA library for the brain tissue of Nile tilapia. 4
10. a) What is agarose? 1  
b) Prepare agarose gel for 150bp and 3kb DNA product. 2  
c) Evaluate the role of different factors that affect the migration of DNA in gel electrophoresis. 4
11. a) "Hybridization is the fundamentals steps of separating specific molecule from a mixture"- justify. 3  
b) Briefly describe the process of in-situ hybridization for melatonin receptor cell. 4
12. a) What do you understand by chromosome manipulation, androgens and gynogens? 2  
b) Develop a layout for the production of tetraploid *Mystus gulio*. 5
13. a) Differentiate between primer and probe. 2  
b) Specify the criteria for designing best quality primer for PCR. 2  
c) What are the transformations observed in the annealing steps? 3
14. a) "Ethical issue should be strongly maintained in genetic engineering"- what is your opinion? 2  
b) Briefly explain the animal rights issue in bioethics. 2  
c) Discuss the safety measures you should follow for the transgenic fish. 3

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**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**

**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) How will you classify micro and macro-algae? What is seaweed? 3  
b) Write scientific and common name of 3 (three) seaweeds from each group. 4
2. a) Write the culture technology of *Porphyra spp.* commercially practiced in Japan. 4  
b) Explain biological activities of marine algae and its potential health benefits through dietary supplements. 3
3. a) Draw a schematic diagram of an ideal seaweed with label. 3  
b) Write down ideal habitats for seaweed culture. Do you think the Bay of Bengal coast possesses all the criteria to culture seaweed on commercial scale? Justify your answer. 4
4. a) Name 2 (two) seaweeds enriched with agar content. Explain commercial uses of agar. 4  
b) Show in diagram the detailed processing protocol of agar from seaweed. 3
5. a) List down popular seaweed based value-added products available in the world. 3  
b) How will you process carrageenan? 4
6. a) What do you mean by harmful algal bloom? Give examples of some types of algae causing harmful algal bloom. 3  
b) What are the factors need to be considered in algal-strain selection for commercial manufacture of biofuels? How do you measure the growth parameters of algae? 4
7. a) What is axenic culture? Write down the composition of PES medium. 3  
b) What are the challenges of seaweed culture in Bangladesh context? 4

**Section-B**

8. a) What is 'renewable energy'? How algae can be a potential source of renewable energy? 3  
b) Write down detail extraction procedure of bio-ethanol from seaweed. 4
9. a) Differentiate between primary and secondary metabolites. Do you think seaweed can be considered as functional foods? 4  
b) List out (at least 9) the value-added products commercially produced from seaweed. 3
10. a) Explain one modern method for the extraction of bioactive compounds from marine macroalgae. 4  
b) Give an account the economic, environmental and social benefits of biofuel production as an alternative to the existing fossil fuel. 3
11. a) What do you know about bio-remediation? Discuss the role of seaweed as bio-remediation in ocean environment. 4  
b) How will you extract fucoidan from seaweed? 3
12. a) What is algal toxin? Enlist 5 (five) toxic compounds derived from algae. 3  
b) What type of algae is responsible for red tide bloom? Suggest a possible solution if an area in the sea is bloomed with red tide. 4
13. a) Seaweed can be considered as useful source of nutrients for human diet- explain. 3  
b) Write down harvesting and drying protocols of seaweeds. 4
14. Write down short notes (any TWO) of the followings: 3.5 x 2 = 7  
a) Blue economy; b) Algal immobilization; c) Biofuel and d) Antimicrobial activities of micro-algae.

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**B.Sc. Fisheries (Hons.) Year - 4 Semester - 1 (January-June), Final Examination, 2021**  
**Course No: FIH 401 (T), Course Title: Fish Immunology & Health Management (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. Define immunology and serology. 2  
b. Briefly discuss impact of diseases in aquatic animals. 5
2. a. Name major trans-boundary aquatic animal diseases with their causative agents. 3  
b. Define quarantine. Discuss the procedure quarantine of aquatic animals. 4
3. a. Name the major sources of aqua-drugs. 3  
b. Briefly discuss the factors to be considered before treating diseased fish. 4
4. a. Distinguish immune response between fish and shrimp. 2  
b. Discuss the mechanisms of immunoglobulin production in fish. 5
5. a. Define aqua-drug, probiotics and antibiotics. 2  
b. Discuss aqua-drug selection criteria for fish disease treatment. 3  
c. Write down the characteristics of adaptive immunity. 2
6. a. Write down the basic structure of immunoglobulin. 2  
b. Discuss the classes of immunoglobulins. What is the function of Fish Ig? 5
7. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Macrophage; ii) Phagocytosis and iii) Melanomacrophage centre (MMC).

**Section B**

8. a. Write down the reason why monoclonal antibodies are powerful immunological tools? 1  
b. How will you prepare the monoclonal (Mabs) and Polyclonal antibodies (Pabs)? 2  
c. Explain in details the procedure for production of Mabs. 4
9. a. Explain rapid non-specific immune system and longer-term specific immune system of fish. 3  
b. Illustrate the fish immune organ and cells with their basic functional system. 4
10. a. Write down the physical barrier of non-specific immunity. 2  
b. Explain in details five major factors which are responsible for the immune protection. 5
11. a. Write down the disadvantages of chemical treatment during aqua-drug administration. 4  
b. Discuss in details the route of aqua-drug administration. 3
12. a. Differentiate between vaccination and chemotherapy. 2  
b. Illustrate the types of vaccines and discuss the methods of vaccine delivery. 5
13. a. Write down the function of fish blood. 2  
c. Discuss first line defenses of immune response of fish. 5
14. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Lectins; ii) Phenoloxidase Activity and iii) Lymphocytes

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B.Sc. Fisheries (Hons.) Year - 2 Semester - 1 (January-June), Final Examination, 2021

**Course No: FNU201 (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 marks.  
Use separate answer script for each section.*

**Section-A**

1. a. Write down the principles of fish nutrition. 2  
b. Describe in details the role of different nutrients in aquaculture practices. 5
2. a. Classified protein according to their form and physical properties. 2  
b. Briefly discuss the functions of protein. How can you evaluate the quality of protein? 5
3. a. Mention the common dietary sources of carbohydrate in fish feed. 3  
b. Discuss the factors influencing the requirement, stability and availability of vitamins in fish nutrition. 4
4. a. What do you understand by energy metabolism in fish? 2  
b. Illustrate the energy balance equation and its application in aquaculture. 5
5. a. Write down the general function of minerals. 3  
b. Explain in details the biological function, deficiency syndrome and dietary sources of pyridoxine and pantothenic acid. 4
6. a. Define digestion. What is the role of enzymes in digestive process of fish? 3  
b. Briefly discuss the digestion, absorption and assimilation of protein, lipid and carbohydrate. 4
7. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Specific Dynamic Action; ii) Energy Portioning Model and iii) Protein Requirements of brood stock

**Section B**

8. a. Classify carbohydrate based on their chemical structure. 2  
b. Write down the major steps for carbohydrate metabolism. 5
9. a. What are the common nutritional disorders found in cultured fish? 3  
b. Write down the effects of nutrient levels on broodstock. 4
10. a. Write down the factors affecting fatty acid composition of fish. 5  
b. Explain the importance of fatty acid profiles in fish nutrition. 2
11. a. Summarize the importance of amino acid profiles in fish nutrition. 4  
b. What are the methods used to assess whether an amino acid is essential or non-essential for the fishes? 3
12. a. Define the rate of digestion. 2  
b. What are the basic methods used to measure the rate of digestion? 5
13. a. Summarize the factors affecting energy requirement of fish. 2  
b. Write down the biochemical function, dietary source and deficiency syndromes in fish of magnesium. 5
14. Write short notes on **any 02 (two)** of the following: 3.5x2=7  
i) Biochemical functions of zinc; ii) Biological function folic acid and iii) Phospholipids.

**Chattogram Veterinary and Animal Sciences University, Chattogram**  
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**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**  
**Course No: MRM-401 (T), Course Title: Mangrove Resources Management (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) Define mangroves. 1  
b) Draw a typical mangrove plant species by indicating its distinct characteristics. 3  
c) Describe the reproductive strategies of mangrove plants. 3
2. a) Classify mangrove vegetation based on physiognomy. 5  
b) "Mangrove habitat considered as a buffer zone"- justify the statement with proper reasons. 2
3. a) Briefly describe world mangrove zonation and its trend. Draw the map if necessary. 4  
b) What ecosystem services a mangrove provide? 3
4. a) "Sundarban mangrove habitat supports a large number of floral and faunal biodiversity through providing productive ecosystem"- clarify the statement. 3  
b) Describe the physiological and anatomical adaptations of mangrove species. 4
5. a) "Coastal pollution is a serious threat for Sundarban mangrove ecosystem"- explain the statement. 3  
b) How climate change can be a threat to the Sundarban ecosystem? 2  
c) Briefly describe the Sundarban river system with its contribution in mangrove productivity. 2
6. a) Illustrate the ecological zonation of the Sundarban mangrove forest. 5  
b) Enlist major existing fisheries closures and rules practiced in Sundarban mangrove forest. 2
7. Short Notes (Answer any two): 3.5×2= 7  
a) Diseases of mangrove, b) Aquaculture vs mangrove and c) Ecotourism in mangrove forest

**Section B**

8. a) Define Red, Black and White mangrove. 2  
b) Explain mangrove restoration. 2  
c) Discuss major mangrove restoration strategies practiced in the world with an emphasis on Sundarban mangrove. 3
9. a) Give an overview of Sundarban wildlife sanctuaries to conserve mangrove resources. Use the map if necessary. 4  
b) Explain how the co-management is an effective management strategy of the Sundarban mangrove forest in Bangladesh. 3
10. a) What are the causes of deforestation of mangroves in Bangladesh? 2  
b) What socio-economic impact has occurred on forest dependent local people due to depletion of Chakaria Sundarban? 3  
c) Do you think the restoration of the Chakaria Sundarban is possible? 2
11. a) Illustrate the major root system of mangrove. . . . 4  
b) Give an overview of areal root system of mangrove including their functions. 4
12. a) How a mangrove forest can protect against natural disasters? 2  
b) How to protect and enhance the capacity of mangrove forest? 2  
c) "Mangrove will be the powerful agent which can combat climate change"- explain the statement. 3
6. a) Briefly describe the ecological succession of mangrove forest. 4  
b) Discuss the regeneration problems experienced by mangrove vegetation. 3
7. Short Notes (Answer any two): 3.5×2= 7  
a) Mangrove forest conversion, b) Mangrove management and social conflict, and  
c) Mangrove as carbon sink

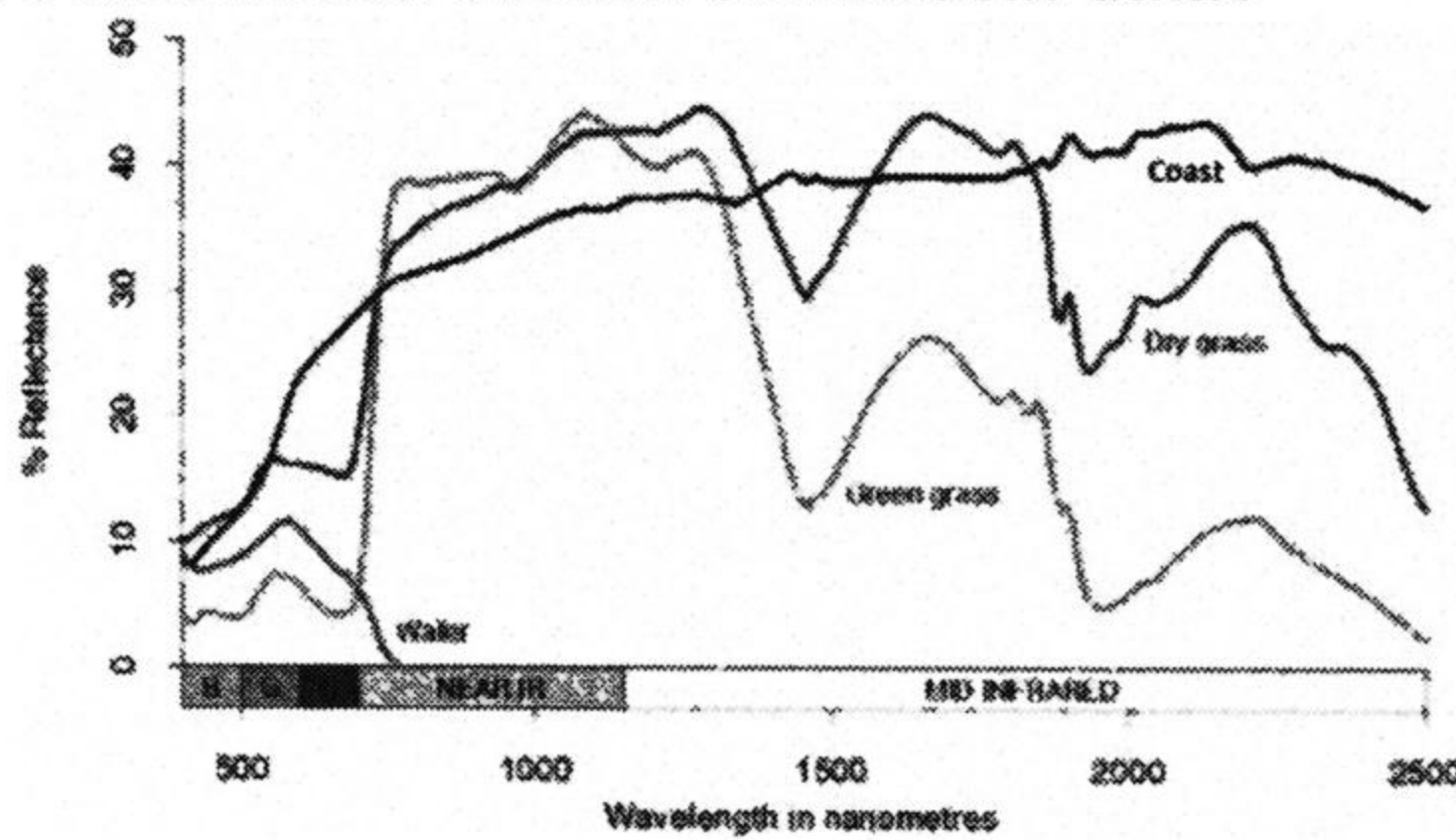
**Chattogram Veterinary and Animal Sciences University, Chattogram  
Faculty of Fisheries**

**B. Sc. Fisheries (Hons.) Year-2, Semester-1, Final Examination 2021  
Course No: GRS 401 (T), Course Title: GIS and Remote Sensing (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) What is GIS and GIS data? How does GIS data differ from other data? 4.0  
b) How to use GIS for a coastal zone management application? 3.0
2. a) Specify the reasons why marine applications of GIS have been slow to materialize. 3.0  
b) Explain the basic processes and functionality involved in RS with labeled figure. 4.0
3. a) What do you understand by spectral signature in remotely sensed data? 2.0  
b) Explain the atmospheric windows and its applicability in RS 2.0  
c) Explain how can you select which bands are most useful for distinguishing between these above mentioned classes of Landsat data? 3.0



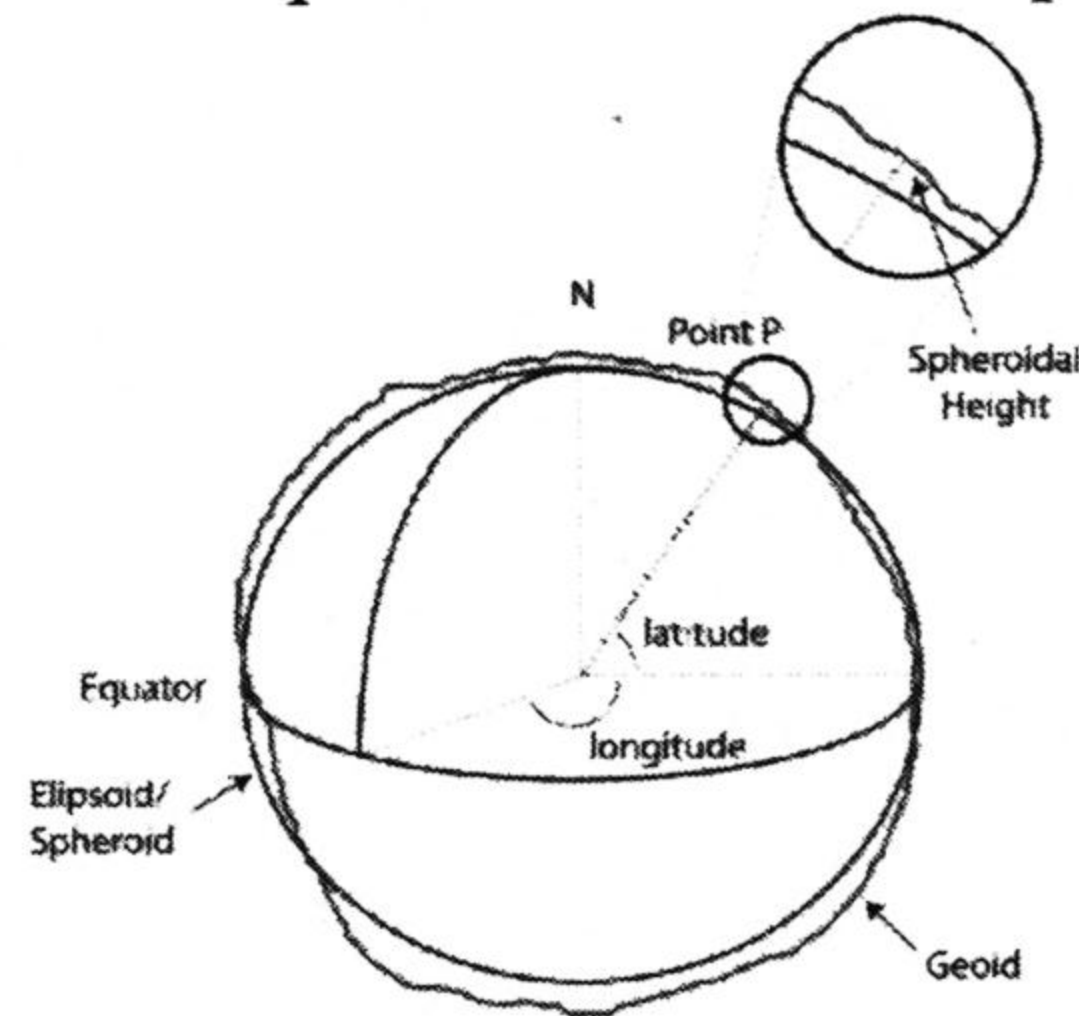
	UV	Blue	Green	Red	Near Infrared
Forest	28	29	36	27	56
Water	22	23	19	13	8
Corn	53	58	59	60	71
Pasture	40	39	42	32	62

4. a) What do you mean by spatial analysis in GIS. 2.0  
b) Distinguish between absolute and relative location with specific example 2.0  
c) Specify the four important dimensions to represent a fishery based mapping. How can you represent the scale in map? 3.0
5. a) What is geometric and radiometric correction? 2.0  
b) Remote sensing largely concerned with reflected radiation-explain. 5.0
6. a) What do you understand by RS Toolkit? 1.5  
b) Specify step by step image processing sequence and their implementation in image analysis and interpretation. 2.5  
c) Describe briefly the main image processing steps to map biophysical properties using RS imagery derived from passive sensors. 3.0
7. Write down the short notes on any two of following: 3.5×2= 7.0
  - a) Properties of distortion
  - b) Ground truthing
  - c) GPS systems and
  - d) Satellite oceanography



## Section B

8. a) What do you mean by geoid, ellipsoid and spheroid shape of the earth? 3.0  
 b) Mention the name of local ellipsoid used in maritime region along with the Bay of Bengal? 1.5  
 c) "The shape of the land and ocean surface is irregular- positioning needs simplification"- 2.5  
 Justify the statement with relevant explanations and examples.



9. a) What is an image, pixel and pixel resolution? 3.0  
 b) Illustrate the path and row map of Landsat satellite over Bangladesh. 4.0
10. a) How can you represent this spatial modeling for digital coastal elevation? 2.0  
 b) What's the significance of optimal triangulation process in case of DEMs? 2.0  
 c) Specify the significance of vertical and horizontal integration process in all geodataset coordinates. 3.0
11. a) How can you specify fish habitat mapping? 1.0  
 b) In which process the marine habitats are mapped and integrated in GIS? 3.0  
 c) Illustrate the process of habitats mapping for Bangladesh maritime region using various applicable tools. 3.0
12. a) What is map generalization? 1.0  
 b) Specify the inputs in map generalization. How can you show the effects of generalization on a map? 3.0  
 c) Write down the primary and secondary data source for a GIS map related to marine fisheries. 3.0
13. a) How spectral signatures initiate the image interpretation as well as image classification? 3.0  
 b) Illustrate in brief the process of image classification using supervised and unsupervised types. 4.0
14. Write down the short notes on Any Two of following topics 3.5×2= 7.0  
 a) Local vs. global ellipsoids  
 b) Vector and raster model  
 c) Polar orbiting satellites and  
 d) Oil spill monitoring

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**B. Sc. Fisheries (Hons.) Year-4, Semester-1, Final Examination 2021**  
**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) What do you mean by extension and fisheries extension? 3  
b) Write down the present condition of fisheries extension in Bangladesh. 4
2. a) Illustrate monitoring and evaluation. 3  
b) Differentiate between monitoring and evaluation. 4
3. a) Enlist the extension organization available in Bangladesh. 2  
b) Write down the qualifications and duties of UFO. 5
4. a) What is meant by learning? Mention the elements of an effective learning process. 3  
b) Describe the Maslow's need theory of motivation with its implication in fisheries extension work 4
5. a) What do you mean by communication? Enlist the elements of communication process. 3  
b) Describe the Berol's model of communication with its limitation. 4
6. Write short notes on the followings (any two): 3.5 x 2 = 7  
a) Socialization  
b) RRA  
c) Motivation cycle.

**Section-B**

7. a) What do you mean by principle of agricultural extension? 2  
b) Enumerate the principles of agricultural extension and briefly describe any one of those. 5
8. a) Define leadership? Write down the importance of local leaders in fisheries extension services. 3  
b) Write down the qualities of a good leader. 4
9. a) What is innovation? Enlist the perceived attributes of fisheries innovation. 3  
b) Discuss the stages in the innovation decision process with suitable diagram. 4
10. a) Illustrate extension programme planning. 2  
b) State the different steps of extension programme planning. 5
11. a) Briefly describe the adopter categories of fishermen on the basis of innovativeness. 3  
b) Differentiate between formal education and non-formal education. 4
12. Write short notes on the followings (any two): 3.5 x 2 = 7  
a) Method demonstration  
b) PRA  
c) Good message.