

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

**Faculty of Fisheries**

**Department of Fish Biology and Biotechnology**

MS in Fish Biology and Biotechnology, July-December Semester Final Examination' 2022

Course Code: **EMF-502**, Course Title: **Embryology of Fishes**

Total Marks: 40

Time: 2 hours

Answer any **FIVE** questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1. a) Explain the following term: embryology, gametogenesis, parthenogenesis, and oviparity. 4  
b) Briefly describe the structure of male gamete with diagram. 4
2. a) What do you understand by spermatogenesis and oogenesis? 2  
b) Summarize the process of oogenesis in fish body. 6
3. a) What do you know about fertilization? 2  
b) Point out the importance of fertilization in aquaculture. 2  
c) Diagrammatically show the fertilization process in fish. 4
4. a) Explain the following terms: polyspermy, micropyle, organogenesis, and metamorphosis. 4  
b) Enumerate the role of thyroid hormone on the metamorphosis process in fish. 4
5. Briefly describe the embryonic stages found in fishes. 8
6. a) Enlist the physical and chemical factors that control the embryonic development in fish. 2  
b) Describe the role of endocrine factors in the embryonic development in fish. 6
7. a) "Parental care is important for the fishes producing a smaller number of eggs"- explain. 2  
b) Explain the parental care behavior observed in different groups of fishes. 6







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MS in Fish Biology and Biotechnology, July-December Semester Final Examination' 2022

Course Code: **BSI-502**, Course Title: **Fish Breeding and Stock Improvement**

Total Marks: 40

Time: 2 hours

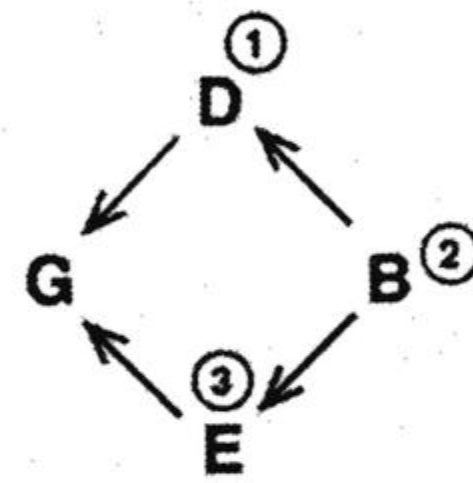
Answer any FIVE questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1. a) What is a hatchery? 1  
b) Discuss the status of fish hatcheries and induced breeding in Bangladesh. 7
2. a) What do you know about inbreeding and effective breeding number? 3  
b) In a given population of *Puntius sarana*, the weight (gm) of the fishes was as follows. The underlined fishes are female and non-underlined fishes are male. 5

800, 692, 995, 776, 690, 752, 616, 814, 735, 845, 670, 528, 790, 634, 492, 735, 809, 757,  
591, 689, 710, 812, 677, 603, 835, 1024, 705, 770, 690, 820, 703, 746, 666, 739, 845, 549,  
777, 956, 530, 724, 587, 659, 798, 655, 591, 501, 505, 802, 698 and 590 gm.

Calculate the inbreeding value from the above population.

3. a) What do you know about hybrids, hybrid vigor and hybridization? 3  
b) Suppose, a carp farmer decides to initiate a hybridization program using *Cirrhinus cirrhosis* (average weight 1520gm) and *Gibelion catla* (average weight 1630gm). The farmer found average offspring weight 1660 gm when mated with *Cirrhinus cirrhosis* male and *Gibelion catla* female. In another mating, the farmer found average offspring weight 1310 gm when mated with *Cirrhinus cirrhosis* female and *Gibelion catla* male. In which cases, hybrid vigor will be produced? 5
4. a) What do you understand by selection, keep and cull? 3  
b) In a given population of *Ompok pabda*, the weight (gm) of the fishes was as follows- 5  
689, 587, 752, 805, 800, 698, 820, 528, 570, 835, 1004, 790, 634, 802, 798, 655, 591, 755,  
809, 757, 591, 677, 549, 677, 659, 746, 666, 995, 776, 690, 630, 724, 616, 814, 725, 845,  
703, 692, 505, 756, 501, 603, 692, 812, 770, 690, 739, 710, 845 and 590 gm.  
Select 10 fishes for disruptive selection program.
5. a) Differentiate between inbreeding and hybridization. 3  
b) Calculate the inbreeding for the population G from the following path. Given that the common ancestor B have inbreeding value was 0.75. 5



6. a) What do you understand by androgen and androgenesis? 2  
b) Briefly describe the production of all male population by androgenesis techniques with appropriate diagram. 6
7. a) What do you know about brood bank and breeding nucleus? 2  
b) How you will plan and maintain a breeding nucleus for the dissemination and aquaculture production as a fisheries officer? 6
8. a) What do you know about heterosis and heritability? 3  
b) Suppose, a fish farmer decides to initiate a selection program for increased growth rate in the *Scatophagus argus*, which currently averages 670g. To implement his program, the farmer selects 30 females that average wt. 705g and 35 males that average wt. 750g. The additive genetic variance was 50% and the phenotypic variance was 95% for the given population. What will be the predicted average weight in the next generation? 5



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MS in Fish Biology and Biotechnology, July-December Semester Final Examination' 2022

Course Code: **GBO-502(T)**, Course Title: **Genetics and Breeding of Ornamental Fishes**

Full Marks: 40

Time: 2 hours

Answer any **FIVE** questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1. a. What do you know about the aqua scaping and its prospects? 2.0  
b. Briefly explain the fundamentals of aqua scaping. 3.0  
c. Discuss the different approaches of aqua scaping with their major features. 3.0
2. a. State the Mendel's Laws of inheritance. 2.0  
b. Write the sex determination systems of Cyprinodonts. 2.0  
c. Discuss the law of independent assortment in the body coloration of molly. 4.0
3. a. Establish a comparison between the pre- and post-larval stages of zebra fish. 2.0  
b. Enlist the optimal water quality parameters for Angel fish larvae. 2.0  
c. Discuss the current scenario of ornamental fishes in Bangladesh. 4.0
4. a. Define sexual dimorphism and gonochorism in fishes. 2.0  
b. Differentiate between egg layers and egg scatters. 2.0  
c. Write the factors affecting the spawning behavior of ornamental fishes. 2.0  
d. Give an account of post spawning behavior of Sword tail fish. 2.0
5. a. What are the major challenges of artificial insemination? 2.0  
b. Enlist five inducing agent that are used in artificial insemination of ornamental fishes. 2.0  
c. Discuss the induced breeding techniques of Fancy guppy. 4.0
6. a. "Traits are the key features of selective breeding"-explain. 2.0  
b. What are the basic rules for selection of qualitative phenotype? 2.0  
c. Discuss the selective breeding program of Black telescope. 4.0
7. a. Define parental care. Write the patterns and diversity of parental care in fishes. 2.0  
b. Briefly describe the pattern of egg deposition into self-made nest in different fish groups. 4.0  
c. What do know about the brood pouches of sea horse and pipe fish? 2.0



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MS in Fish Biology and Biotechnology, July-December Semester Final Examination' 2022

Course Code: **MBI-502**, Course Title: **Molecular Biology**

Total Marks: 40

Time: 2 hours

Answer any **FIVE** questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

- |    |    |  |   |
|----|----|--|---|
| 1. | a) | What is a molecule?  | 1 |
|    | b) | Enlist the major classes of molecule with example.   | 3 |
|    | c) | Enumerate the properties of molecule with appropriate example.   | 4 |
| 2. | a) | What do you know about the mutation, mutagen and mutagenesis?  | 3 |
|    | b) | Briefly describe the different types of mutagens observed in nature.                                       | 5 |
| 3. | a) | What do you know about gene expression?  | 2 |
|    | b) | Explain the transcription process with appropriate diagram.  | 6 |
| 4. | a) | What is a chromosome?  | 1 |
|    | b) | Enlist the genetic significance of a chromosome.   | 3 |
|    | c) | Categorize the different types of chromosomes based on the position of centromere with appropriate figure. | 4 |
| 5. | a) | What do you know about gene and gene mapping?  | 2 |
|    | b) | Schematically show the classification of gene mapping techniques.  | 3 |
|    | c) | Point out the application of gene mapping in fisheries science.  | 3 |
| 6. | a) | What do you know about MHC?  | 2 |
|    | b) | Enlist the major groups of MHC molecules with example.   | 2 |
|    | c) | Briefly describe the endogenous processing pathway of MHC class I with diagram.                            | 4 |
| 7. | a) | What do you know about macroglobulin?  | 2 |
|    | b) | Draw and label the structural form of alpha-1 and $\beta$ 2 macroglobulin.                                 | 4 |
|    | c) | Write down the function of $\beta$ 2 macroglobulin.  | 2 |



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Course Code: **RPF-502**, Course Title: **Reproductive Physiology of Fishes**

Total Marks: 40

Time: 2 hours

Answer any **FIVE** questions from the following. Illustrate your answer wherever necessary. The figure in the right margin indicates full marks.

1. What do you know about vitellogenin and vitellogenesis? Briefly describe vitellogenesis process in fish. 8
2. What do you know about spermatogenesis, oogenesis and gametogenesis? Explain the process of spermatogenesis in fish body. 8
3. What do you know about sperm viability and sperm motility? Enlist and describe the physico-chemical factors that affect the sperm motility and viability in fishes. 8
4. What do you understand by puberty? Diagrammatically show the hormonal control of puberty in farmed fishes. 8
5. Enlist the factors influencing the reproduction in fishes. Briefly describe the nutritional factors on the spawning behavior in fishes. 8
6. What do you understand by courtship and parental care? Outline the reproductive behavior observed in different groups of fishes. 8
7. Summarize the impact of water pollution on the fish reproduction. 8