

Chittagong Veterinary and Animal Sciences University, Chittagong

Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, Jul-Dec. Semester, Final Exam/2018

Course No & Title.: MBI- 502 (T), Molecular Biology

Time: 2hr,

Full Marks: 40

Answer **any five (05)** from the following. Figure in the right margin indicates full marks. Split answer is not acceptable.

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| 1. | a. | What is chromatin and nucleosome? | 2.0 |
| | b. | What are the chromosomal proteins? Mention the functions of chromatin. | 2.0 |
| | c. | Describe the process of chromatin organization. | 4.0 |
| 2. | a. | What do you mean by gene expression? | 1.0 |
| | b. | Explain the mechanism of gene expression in eukaryotes? | 7.0 |
| 3. | a. | What is mutation and mutagenesis? Mention the importance of mutation. | 2.0 |
| | b. | Differentiate between germinal mutation and somatic mutation. | 2.0 |
| | c. | Briefly describe the chromosomal mutation with appropriate figures. | 4.0 |
| 4. | a. | What do you mean by gene mapping? What are the major types of gene mapping? | 2.0 |
| | b. | Construct and explain genetic mapping of chromosomes of fish species. | 6.0 |
| 5. | a. | What is MHC? Mention the structural differences between MHC class I and MHC class II molecules. | 3.0 |
| | b. | What are antigen presenting cells? Illustrate the MHC-associated cellular defense system of fish. | 5.0 |
| 6. | a. | Why is gene regulation necessary? | 2.0 |
| | b. | What are the regulated stages of gene expression? | 1.0 |
| | c. | Explain the transcriptional regulation of gene expression. | 5.0 |
| 7. | a. | What do you mean by genetic code, codon and anti-codon? | 2.0 |
| | b. | Explain the different sources of spontaneous mutation. | 6.0 |

Chittagong Veterinary and Animal Sciences University, Chittagong

Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, Jul-Dec Semester, Final Exam/2018

Course No & Title.: BSI- 502 (T), Fish Breeding and Stock Improvement

Time: 2hrs,

Full Marks: 40

Answer **any five (05)** from the followings. Figures in the right margin indicate full marks. Split answer is not acceptable.

1. a. What do you mean by hybridization? Mention the merits and demerits of hybridization. 3.0
- b. Explain the different types of crossbreeding program with example. 3.0
- c. How does unplanned hybridization affect in genetics of fish population? 2.0
2. a. Define selective breeding for quantitative traits. 2.0
- b. Briefly explain a suitable model of selective breeding for major carps. 6.0
3. a. What do you mean by gene introgression and heterosis. 2.0
- b. Explain heterosis with example. 3.0
- c. 'Hybridization does not produce good brood stock' - justify the statement with example. 3.0
4. a. What do you mean by effective breeding number and inbreeding co-efficient? 2.0
- b. How will you minimize the rate of inbreeding in hatchery populations for executing stock improvement programme? 6.0
5. a. What is brood bank? 1.0
- b. Why brood bank of fish is necessary for sustainable aquaculture? 7.0
- c. Make a plan to establish a brood bank for sustainable aquaculture.
6. a. How is inbreeding and effective breeding number related? 3.0
- b. How will you calculate average inbreeding value in hatchery populations? 5.0
7. a. What do you mean by genetic management of broodstock? 1.0
- b. Briefly describe the present scenario of broodstock management in fish hatcheries of Bangladesh. 5.0
- c. Give your suggestions to improve the existing problems in hatcheries of Bangladesh. 2.0

Chittagong Veterinary and Animal Sciences University, Chittagong
Department of Fish Biology and Biotechnology
MS in Fish Biology and Biotechnology, Jul-Dec semester, Final Exam/2018
Course No & Title.: AIC- 502 (T), Advanced Ichthyology
Time: 2hr, Full Marks: 40

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

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| 1. | a. | What is taxonomy and how does it differ from systematics? | 1.0 |
| | b. | What are the main requirements to describe a taxon? | 2.0 |
| | c. | Make an ecological classification of fresh and marine water bony fishes of the world. | 5.0 |
| 2. | a. | What do you know about the evolutionary trends in fish morphology? | 3.0 |
| | b. | Describe the structure of swim bladders of fish. | 3.0 |
| | c. | Explain the role of gas bladder as hydrostatic organ. | 2.0 |
| 3. | a. | What do you mean by phylogeny and phylogenetics? | 2.0 |
| | b. | Diagrammatically show the different parts of a phylogenetic tree. | 3.0 |
| | c. | 'Phylogenetic tree reveals evolutionary history of living organism'-explain with example. | 3.0 |
| 4. | a. | What do you know about sensory mechanism in fishes? | 2.0 |
| | b. | Describe lateral line sensing system in aquatic vertebrates. | 6.0 |
| 5. | a. | What do you mean by evolution? | 1.0 |
| | b. | Explain the evolutionary pattern of bony fish with diagram. | 7.0 |
| 6. | a. | What is meant by zoogeography? | 1.0 |
| | b. | Make a list of freshwater zoogeographic regions. | 1.0 |
| | c. | Describe any three important zoogeographical regions mentioning dominant fish fauna. | 6.0 |
| 7. | a. | What do you mean by adaptation? | 1.0 |
| | b. | How do deep sea fishes adapt themselves to their environment? | 7.0 |

Chittagong Veterinary and Animal Sciences University, Chittagong
Department of Fish Biology and Biotechnology
MS in Fish Biology and Biotechnology, Jul-Dec Semester, Final Exam/2018
Course No&Title.: GBO- 502 (T), Genetics and Breeding of Ornamental Fishes
Time: 2hr, Full Marks: 40

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

1. a. Discuss the current status and prospects of ornamental fish in Bangladesh. 6.0
b. Explain 'ornamental fish' as model animal for biological research. 2.0
2. a. What do you mean by Mendelian inheritance? 2.0
b. Explain the inheritance pattern of colour polymorphism in *Poecilia*. 6.0
3. a. Make a list of five ornamental fishes with their common name and scientific name. 2.0
b. Briefly explain the feed requirements and spawning requirements of the following ornamental fishes: Angel fish, Discus and Sword tail. 6.0
4. a. What are the different types of aquarium? 2.0
b. Make a plan of setting up an aquarium for ornamental fish culture. 6.0
5. a. What do you mean by sexual dimorphism? 2.0
b. Describe the sexual characters in ornamental fish with example. 6.0
6. a. What is selective breeding? 1.0
b. Describe the breeding of gold fish (*Carassius auratus*)? 7.0
7. a. What are the different modes of reproduction found in fishes? 3.0
b. Explain the factors triggering maturation and spawning. 5.0

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Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, Jul-Dec Semester, Final Exam/2018

Course No & Title.: RPF- 502 (T), Reproductive Physiology of Fishes

Time: 2hrs,

Full Marks: 40

Answer **any five (05)** from the followings. Figure in the right margin indicates full marks. Split answer is not acceptable.

- a. Define reproduction. Discuss with appropriate examples different modes of reproduction observed in fishes. 6.0
- b. Write the importance of studying reproductive physiology of fishes in context of aquaculture. 2.0
2. a. How oocyte growth is regulated by hormone? 5.0
- b. Discuss how sperm motility is regulated. 3.0
3. a. What do you mean by puberty? 2.0
- b. Discuss the role of Brain-Pituitary-Gonad axis on the onset of puberty in fish. 6.0
4. a. What do you know about the morphology of micropyle of fish eggs? 3.0
- b. Explain the urogenital system in female fishes with figure 5.0
5. a. Differentiate among oviparous, viviparous and ovo-viviparous. 3.0
- b. Briefly discuss different types of maternal-embryonic relationships in fishes. 5.0
6. a. What do you mean by reproductive behavior? 1.0
- b. Describe the breeding behavior of Nile Tilapia (*Oreochromis niloticus*) with necessary figures. 7.0
7. a. Mention the different factors affecting reproduction of fish. 1.0
- b. Explain the major factors regulating reproduction of fishes. 7.0

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Department of Fish Biology and Biotechnology

MS in Fish Biology and Biotechnology, Jul-Dec Semester, Final Exam/2018

Course No & Title: EMF- 502 (T), Embryology of Fishes

Time: 2 hours,

Full Marks: 40

Answer **any five (05)** questions from the followings. Figure in the right margins indicates full marks.

1. a. What do you mean by embryology of fishes? 1.0
- b. Explain why studying embryology of fishes is important? 2.0
- c. Discuss the different types of sexual reproduction with examples. 5.0
2. a. What is gametogenesis? Explain the changes occur in spermatids of fish during spermiogenesis with figures. 5.0
- b. Diagrammatically show the structural components of a mature sperm with their functions. 3.0
3. a. What are the different types of fertilization? Mention the steps during fertilization. 3.0
- b. Explain the prevention mechanism of polyspermy. 5.0
4. a. Define parthenogenesis. How does normal fertilization and parthenogenesis differ? 3.0
- b. Explain different types of natural and artificial parthenogenesis with example. 5.0
5. a. What is meant by gastrulation? 1.0
- b. How does gastrulation process take place in sea urchin? 5.0
- c. Diagrammatically show the fate of germ layers formed during gastrulation. 2.0
6. a. What are the different types of cleavage? 2.0
- b. Describe the cleavage pattern in different groups of fish. 4.0
- c. Differentiate between holoblastic and meroblastic cleavage. 2.0
7. a. 'Embryonic induction initiates organ formation'-explain the statement with example. 3.0
- b. Explain how does gene affect in early developmental stages of fish? 5.0