

CSM – 28 / 15
Fisheries Science
Paper – I

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

*Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory and **three** of the remaining questions, selecting at least **one** from each Section.*

Section – A

1. Answer any **three** of the following : $20 \times 3 = 60$
 - (a) Describe the organizational set-ups in fisheries development in India. Discuss the various regulatory enforcements for protection of fishery resources.
 - (b) Classify the order Perciformes up to family level giving two examples for each.
 - (c) What are the different orders under the group shellfishes ? Give salient characters of each order with suitable examples.

- (d) Explain the structure and function of circulatory system in finfishes. Discuss the structural modifications in heart for different finfishes.
2. (a) What is gut content analysis ? Describe the different qualitative and quantitative methods applied to estimate the stomach contents in fishes. 20
- (b) Explain the different methods used to ascertain stage of sexual maturation in fishes. Discuss the maturity scales adopted for marine and freshwater fishes. 20
- (c) Describe, in brief, the osmoregulation in fishes. Explain the difference between marine and freshwater fishes in maintaining the body salt concentration. 20
3. (a) What are endocrine glands ? Describe the different endocrine glands in finfishes with their function in various metabolic and reproductive activities. 20
- (b) Describe briefly the developmental biology of crab with suitable illustrations. 20

- (c) What are the important cold water fisheries resources of India ? Describe the current fish production and potential of important cold water lakes of Kashmir Valley. 20
4. (a) What is surplus production ? Describe the different surplus production models with their merits and demerits. 20
- (b) Explain briefly at least one method of estimation of protein, lipid, carbohydrate and minerals in fishes. 20
- (c) What are the different methods for controlling pathogenic micro-organisms in fishes ? Discuss their merits and demerits. 20

Section – B

5. Answer any **three** of the following : $20 \times 3 = 60$
- (a) What are the different biological communities in an inland water ecosystem ? Describe their respective role in the productivity and food web of the system.
- (b) Classify wetland areas and discuss how their physico-chemical and biological characteristics can be adapted for fisheries and aquaculture.

- (c) What are the important mangrove ecosystems in India ? Discuss the role of mangroves in fish conservation.
- (d) List out the important coral reef areas of the World. Discuss the important coral reef conservation organizations in respective countries and their roles.
6. (a) Differentiate between bioaccumulation and biomagnifications. Discuss the different sources of bioaccumulation in aquatic environments and management measures. 20
- (b) Define and discuss the radioactive pollution and its impact on aquatic life. Discuss the management and control measures. 20
- (c) Define sewage and describe the different methods for sewage treatment and management. 20
7. (a) What do you understand by law of diminishing marginal return ? Write its importance in decision making of farm production and discuss the different stages of classical production function. 20

- (b) What do you understand by project planning ? Describe the stages of project life cycle and also discuss, in brief, about development of fisheries in different plan period. 20
- (c) What do you understand by the term cooperation ? Describe the principles of cooperation ; also discuss the structures and functions of fishermen cooperatives in India. 20
8. (a) What do you understand by the fisheries administration ? Write the salient features of Indian Fisheries Act, 1897 and its importance in conservation of fisheries resources in India ? 20
- (b) Discuss about the measures of central tendency and measures of dispersion ; discuss Z-test and t-test and its application in comparing mean. 20
- (c) Describe extension methods ; explain about organization structure of fisheries extension in the country. Write short notes on FFDA and BFDA. 20

