

**CSM – 28/16**

**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) Comment on fish resources(fish and shellfish) in India and their role in fisheries and aquaculture contributing to Indian economy.
  - (b) Write a detailed note on growth and development of fisheries and aquaculture during different five year plan periods in India.

- (c) Classify the order Cypriniformes up to generic level with characteristics of each level with an example.
  - (d) With a neat diagram, explain the structure and function of digestive system in **Catla catla** and cat fish. Discuss the structural modifications in them from mouth to anus with respect to their feeding habit.
2. (a) Explain reproduction, spawning and developmental biology of a typical cyprinid fish taking the example of **Labeo rohita**. 20
- (b) Comment on endocrine glands and their function in metabolic and reproductive activities of carps. 20
- (c) Compare and comment on osmoregulation and migration between freshwater and marine fishes. 20
3. (a) Explain fish and fisheries of major reservoir and estuarine systems in India. 20
- (b) Discuss on major exploited marine fishery resources and their conservation and management in India. 20

- (c) Write a detailed note on fisheries regulations in India promulgated as a means of conservation measure. 20
4. (a) Explain the different steps involved in an aerobic break down of a glucose molecule into ATP. 20
- (b) Discuss on the different spectrophotometric, chromatographic and electrophoresis techniques used in fisheries. 20
- (c) Write a detailed note on the host microbe interaction in the process of infection, development of immunity and immunoglobulins. 20

### SECTION – B

5. Answer any **three** of the following :  $20 \times 3 = 60$
- (a) Discuss about classification and distribution of lakes, ponds, streams and reservoirs with a note on estuaries.
- (b) Write a detailed note on different nutrient cycles and food chain occurring in inland water body.

- (c) Discuss on biological communities that are found in rocky, sandy and muddy shores of marine environment.
  - (d) Explain the different divisions of marine environment and topographic features of sea bottom.
6. (a) Discuss major groups of plankton and their geographical and seasonal variation in an aquatic ecosystem. 20
- (b) Write a detailed note on El Nino and its influence on water current in ocean and fisheries. Also, comment on Tsunami and its effects. 20
- (c) Write a detailed note on different oceanographic equipment used in sampling of water, plankton and benthos, and also during oceanographic expeditions. 20
7. (a) Write a detailed note on radioactive pollution, its source, its effect on aquatic habitat, management and control measure to manage radioactive pollution. 20

- (b) Discuss on fish marketing system in India and marketing management with special reference to Odisha. 20
- (c) What are fishermen cooperatives, their structure, function, problems and remedial measures adopted for their growth in India ? 20
8. (a) Write a note on state reservoir fishery policy and marine fisheries regulation acts with a note on Odisha Fisheries Act. 20
- (b) Write a detailed note on EEZ and integrated coastal zone management in India. 20
- (c) Define non-parametric tests and write its advantages and disadvantages. Define correlation and regression. Explain correlation types with a neat scatter diagram. 20



