

**CSM – 28/18**

**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 :
  - (a) Write a detailed note on fisheries resources of India and role of fisheries and aquaculture in Indian economy and aquaculture growth. 20
  - (b) Discuss about classification and taxonomical characteristics of commercially important freshwater, brackish water and marine fishes of India. 20

- (c) Give an account of frontier research and global scenario in fisheries and aquaculture. 20
- (d) Write a note on the fisheries education and research in India and organization setups in fisheries development at national and international context. 20
2. (a) Give an account of different types of aquaculture systems with a note on brackish water shrimp culture. 20
- (b) Explain anatomy and physiology of carps and murels. 20
- (c) Discuss breeding habits of commercially important fin fishes in India with a note hypophysation of carps. 20
3. (a) Give an account of freshwater aquaculture in India with a special reference to culture of Indian major carps. 20
- (b) Explain the process of oogenesis and spermatogenesis in carps. 20
- (c) Discuss about micro-organisms, types of immunity in fish with a note on important nutrient cycles in pond. 20

4. (a) Give an account of gills, intestine and kidney as osmoregulatory systems of fish. 20
- (b) Explain basic functions and roles of biomolecules in fish with special reference to protein and amino acids and lipids and fatty acids. 20
- (c) Discuss about marine fisheries resource management with special reference to maximum sustainable yield and maximum economic yield. 20

### SECTION – B

5. Answer any three of the following :
- (a) Discuss about biological communities and productivity in ponds with special reference to phytoplankton, zooplankton and benthos. 20
- (b) Explain about oceanographic phenomenon-waves, tides and currents with a note on El Nino. 20
- (c) Write about classification and distribution of lakes, ponds, streams, reservoirs, estuaries, mangroves and flood plains. 20

- (d) Discuss about laws of the sea with special reference to Integrated Coastal Zone Management and Exclusive Economic Zone. 20
6. (a) Discuss about marine and inland fish marketing in India, with a note on cold chain. 20
- (b) Explain biological communities in rocky, sandy and muddy shores. 20
- (c) Give an account on the different oceanographic equipments used with a note on sediment collection. 20
7. (a) Describe the formation of coral reefs and its action and importance as an ecosystem. 20
- (b) Discuss about aquatic pollution with special reference to organic, inorganic and radioactive pollutants in water bodies with a note on eutrophication of lakes. 20
- (c) Explain sewage treatment methods and effluent and waste management. 20

8. (a) Discuss about fisheries extension with notes on FFDA, BFDA, NATP and ATMA in developing fisheries and aquaculture. 20
- (b) Explain the growth and development of fisheries and aquaculture during different five year plan periods in India. 20
- (c) Give an account of sampling methods used in fish stock assessment with a note on statistical errors-standard deviation and standard error. 20



