

3 Hours

Total Marks: 100

1. Attempt **all** questions.
2. **All** questions carry **equal** marks.
3. Draw **neat labelled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculators** is **allowed**.

**Q.1 a. Select the correct alternative: (Any Six)****06**

1. Communities that occur between the edge of the continental shelf and the land-sea border
  - a. Neritic
  - b. Abyssopelagic
  - c. Bathyal
  - d. Hadal
2. Organisms that flow at the mercy of the sea current are called
  - a. Nekton
  - b. Plankton
  - c. Zooplankton
  - d. Benthos
3. Organisms that are able to swim and move independently of currents are called
  - a. Benthos
  - b. Zooplankton
  - c. Plankton
  - d. Nekton
4. Which of the following is NOT an adaptation undertaken by rocky intertidal organisms
  - a. Strong means of attachment
  - b. Mechanism to survive desiccation
  - c. Mechanisms of sealing themselves off during low tide
  - d. Tolerating substantial saltwater exposure
5. \_\_\_\_\_ is a semi-enclosed coastal body of water that has a free connection with the open sea and within which seawater is measurably diluted with freshwater derived from land drainage
  - a. Tidal basins
  - b. Seagrass beds
  - c. Salt Marshes
  - d. Estuary
6. Which of the following molecular tools is used to study the carbon cycle?
  - a. FISH
  - b. Carbon Tracker
  - c. Stable Isotope Analysis
  - d. Carbon Scanner
7. Domoic acid can be used as
  - a. Anti-inflammatory
  - b. Antibiotic
  - c. Antiviral
  - d. Antiparasite
8. One of the limitations encountered with the culturing of marine bacteria is the loss of interaction between microbial cells. What is the solution for this limitation?
  - a. Dilution
  - b. High-throughput cultivation and screening
  - c. Use of high-nutrient filtered seawater
  - d. Diffusion device

9. Carrageenan can be used as
- |                  |                      |
|------------------|----------------------|
| a. Antibiotic    | b. Anti-inflammatory |
| c. Anticoagulant | d. Antiviral         |

**Q.1 b. Answer the following questions: (Any Two)**

**14**

1. What are the defining features of the rocky intertidal zone, and how do organisms living there adapt to their environment?
2. Discuss toxins obtained from marine organisms.
3. Provide an account of the functioning of three different marine ecosystems.

**Q.2 a. Select the correct alternative: (Any Six)**

**06**

1. The molecular structure of Kahalalide F is \_\_\_\_\_.  
 a) Cyclic tridecapeptide      b) Aminosterol  
 c) Polyacetate      d) Arabinofuranosyl adenine
2. The relationship between \_\_\_\_\_ and health has led to the concept of functional food.  
 a) Medicine      b) Nutrition      c) Enzymes      d) Cosmetics
3. The specific feature of enzyme lipase B derived from *Candida antarctica* is \_\_\_\_\_.  
 a) Enzyme is a barophilic enzyme  
 b) Enzyme is halotolerant enzyme  
 c) Enzyme is a thermophilic enzyme  
 d) Enzyme is an enantioselective enzyme
4. The new paradigm in drug discovery is dominated by \_\_\_\_\_ approaches which are expected to lead to multiple new target.  
 a) Pharmacological      b) Genomic based  
 c) Proteomic based      d) Biochemical
5. \_\_\_\_\_ drug is synthesized by *Bugula neritina*.  
 a) Halichondrin B      b) Bryostatin 1  
 c) Squalamine      d) Kahalalide F
6. \_\_\_\_\_ is a neurotoxin derived from puffer fish.  
 a) Saxitoxin      b) Omega conotoxin  
 c) Alpha conotoxin      d) Tetrodotoxin
7. \_\_\_\_\_ organism secretes omega conotoxin.  
 a) *Aplidium albicans*      b) *Tethya crypta*  
 c) *Conus magus*      d) *Ecteinascidia turbinata*

8. The \_\_\_\_\_ drug is used for the treatment of refractory multiple myeloma and T cell lymphoma.
  - a) Vidarabine
  - b) Aplidine
  - c) Cytarabine
  - d) Bryostatins 1
9. Fuelzyme is thermostable \_\_\_\_\_.
  - a) Protease
  - b) Lipase
  - c) Amylase
  - d) Cellulase

**Q.2 b. Give an account on the following questions: (Any Two)**

**14**

1. Discuss the thermostability and cold adaptivity of marine extremozymes.
2. Elaborate on – Marine natural products at the crossroads between functional foods and pharma.
3. With a suitable example, explain the current use and status of marine microbial enzymes.

**Q.3 a. Select the correct alternative: (Any Six)**

**06**

1. \_\_\_\_\_ is an example of cyanobacterium.
  - a. *Nostoc*
  - b. *Halobacterium*
  - c. *Streptomyces*
  - d. *Aspergillus*
2. \_\_\_\_\_ are the rich sources of EPA and DHA.
  - a. Diatoms
  - b. Salmon fish
  - c. Sponges
  - d. Bombay duck
3. \_\_\_\_\_ is an example of carotenoid pigment derived from salmon fish.
  - a. Phycobilins
  - b. Chlorophylls
  - c. Astaxanthin
  - d. Lycopene
4. \_\_\_\_\_ is used as a stabilizer and thickener in gels and foods.
  - a. PUFAs
  - b. Carrageenan
  - c. Lutein
  - d. Astaxanthin
5. \_\_\_\_\_ has the ability to protect eye related complications such as cataract.
  - a. Lutein
  - b. Astaxanthin
  - c. Lycopene
  - d. Xanthophyll
6. \_\_\_\_\_ could be the functional food ingredients.
  - a. Water
  - b. Buffer
  - c. PUFAs
  - d. Salt
7. \_\_\_\_\_ is the most common and representative marine sulphated polysaccharide.
  - a. Histamine
  - b. Heparin
  - c. Fucoidan
  - d. Pentosan
8. Polysaccharides produced by \_\_\_\_\_ have the viscosity properties similar to xanthan gum.
  - a. *Undaria pinnatifida*
  - b. *Cyanospira capsulata*
  - c. *Ecklonia cava*
  - d. *Ascophylum nodosum*
9. \_\_\_\_\_ are sold as powders or pills or other medicinal forms not associated with foods.
  - a. Functional foods
  - b. Nutraceuticals
  - c. Fruits
  - d. Vegetables

**Q.3 b. Discuss the following: (Any Two) 14**

1. Functional foods incorporating marine-derived seaweeds and polysaccharides.
2. Biological activities of fatty acids and phenolic compounds as an ingredient in nutraceuticals.
3. Seaweeds and microalgae as potential marine sources for functional food ingredients.

**Q.4 a. Do as Directed: (Any Six) 06**

1. What are Cosmeceuticals?
2. \_\_\_\_\_ is a multifunctional bioactive compound that is obtained from the polysaccharide chitin.
3. Give an example of a marine organism used as a source of proliferative drug for hair growth.
4. Give one example of a marine organism used as a source of Chitin.
5. Give one example of a lipid from a marine bioresource.
6. Give the application of marine proteins.
7. Name any one Emulsifier obtained from marine resources.
8. Name any one skin-firming agent obtained from marine resources.
9. State True or False: Eckol and Dieckol are phlorotannins.

**Q.4 b. Give an account of the following questions: (Any Two) 14**

1. General composition of cosmetics.
2. Therapies based on Marine resources.
3. Anti-allergic, anti-microbial, and anti-wrinkling activities of marine components in cosmetics.

**Q.5 Write Short notes on the following: (Any Four) 20**

- a. Coral reefs.
- b. Bioprospecting in marine environments.
- c. Approved marine drugs as pharmaceuticals.
- d. Fermentation and related research.
- e. Nutraceutical potential of carotenoids.
- f. Depigmenting activity of marine derived components of cosmetics.