

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1831

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Unique Paper Code : 2163012003

Name of the Paper : Applied Phycology

Name of the Course : **Botany (DSE)**

Semester : IV

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** questions are compulsory.
3. Attempt **all** parts of a question together.

1. (A) Expand the following (**any 10**)

10X1=10

- a) BBM Medium
- b) BOD
- c) DDT
- d) DHA
- e) EDTA
- f) EPA
- g) HAB
- h) HRAP
- i) PAH
- j) PAR
- k) PBRs
- l) PES Medium
- m) PUFA
- n) ROS

(B) Give **ONE** alga (Generic name) associated with (**any five**):

5x1=5

- a) Alginate
- b) Astaxanthin
- c) beta-carotene
- d) Bioluminescence
- e) Carrageenan
- f) Pollution Indicator
- g) Space food
- h) Heterocysts

2. Draw a well labelled diagram of the following (**any Three**)

3X5=15

- a) Draw a well-labelled diagram displaying the structural morphology of *Acetabularia*.

P.T.O.

- b) Provide a detailed, labelled diagram illustrating the structure of a cyanobacterial heterocyst.
- c) Draw a schematic diagram of a closed photobioreactor, ensuring all primary components are clearly labelled and explained.
- d) Provide a well-labelled diagram of a phycoremediation system utilised for wastewater treatment using algae.
- e) Draw a sequential schematic diagram demonstrating the process of biodiesel production from microalgae.
- f) Illustrate the complex life cycle of *Porphyra* using a comprehensive, well-labelled diagram

3. Briefly explain (**any three**)

3X5=15

- a) Write a short note on the development and environmental potential of algal bioplastics.
- b) Explain the causes of red tides and discuss the impact of three major algal toxins (phycotoxins).
- c) Describe the preparation and agricultural benefits of seaweed liquid extracts (SLE) as biofertilisers.
- d) Explain why *Ectocarpus* is considered an ideal model organism for genetic and developmental studies in brown algae.
- e) 'algae are the ideal superfoods of the future'. Support this statement by detailing the nutritional benefits of at least five distinct examples from various algal groups.

4. Answer **any two** of the following

2X7.5=15

- a) Distinguish between the first, second, and third generations of biofuels. Discuss how algal biofuels address the limitations of earlier generations, and outline the current commercial challenges facing the algal biofuel industry.
- b) Write an account of the various applications of algal phycocolloids.
- c) Outline the economic and environmental benefits of seaweed farming. Explain two standard methods of commercial seaweed cultivation and discuss the primary challenges currently faced by the mariculture industry.
- d) Briefly discuss the formation of diatomaceous earth and explain its various commercial and industrial applications.