



Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech(BT)/SEM-3/MBT-305/2010-11

2010-11

ENVIRONMENTAL BIOTECHNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Objective Type Questions)

1. Answer any *ten* of the following in brief : 10 × 1 = 10
- i) Name five principal resources on earth.
 - ii) Draw the basic structure of bio-diesel precursor obtainable from nature.
 - iii) Define a watershed.
 - iv) What is the principal indicator of a disturbed ecosystem ?
 - v) What is the permissible limit for Mercury in drinking water according to public health engineering authority ?



- vi) Name the two elements with successive maximum abundance (% weight) in Earth's crust ?
- vii) Define alluvial soil.
- viii) What is the physical significance of temperature ?
- ix) What is biosensor ?
- x) What is the active chemical in *Bacillus thuringiensis*, which acts as an insecticide ?
- xi) What is biomineralization ?
- xii) Organophosphate in water can be assayed continuously by an immobilized enzyme. Name it.
- xiii) Describe the reaction involved in assaying organophosphate by immobilized enzyme.
- xiv) How arsenic come in the soil and water ?
- xv) Name the plant which is hyperaccumulator of arsenic.
- xvi) What is bioremediation ?
- xvii) What is bioaugmentation ?
- xviii) What is bioaccumulation ?



GROUP – B

(Short Answer Type Questions)

Write short notes on any *three* of the following. $3 \times 5 = 15$

2. Genetically engineered microbes for sequestering heavy metal.
3. Transgenic plants for phytoremediation.
4. Single cell protein and biomass for water treatment
5. Environmental biotechnology in paper industry.
6. Environmental biotechnology for air-pollution abatement.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Define how the earth crust was formed and the present composition of it with respect to 10 principal components. Define the reaction in the sun that gives birth to elemental diversity. What is the temperature of sun core ? Calculate the sun surface temperature from it.
8. What are the principal considerations for accurate measurements of environmental pollutants. Define the technique “spectrophotometry” as the predominant one in such measurements ? Define it's principal and discuss the common sources of error associated with employment of this technique.



9. What are the primary air pollutants in our country ? Provide the national standards for all such air pollutants and discuss their relationship with specific sources.

10. What is understood by biogas ?

What are the different types of methanogenic bacteria ; those are responsible for production of methane ?

What is the rate limiting factor for such production after acidogenesis ?

What are its possible uses compared to coal gas ?

2 + 10 + 2 + 1

11. Describe the various methods by which phytoremediation could be carried out.

What are its advantages ?

How arsenic from contaminated soil could be removed by phytoremediation ? State the reaction involved.

3 + 2 + 8 + 2

12. How knowledge of environmental biotechnology could be applied for

a) waste and industrial water treatment ?

b) drinking water treatment ?

c) soil and land treatment ?

5 + 5 + 5

