



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Sc. (GEN)/SEM-4/MSGEN (EBT)-403/2013
2013**

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

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Green peace is

a) Indian

b) Global

c) Asian

d) American campaigning organization.



- ii) The Kyoto Protocol treaty was negotiated in December at the city of Kyoto, Japan and came into force on February 16th, 2005.
- a) 2001
 - b) 1997
 - c) 2000
 - d) 1996
- iii) The study of the relationship occurring between different microbial populations and their environments is
- a) microbial evolution
 - b) microbial physiology
 - c) microbial ecology
 - d) microbial biochemistry.
- iv) The soil material composed of humus consists primarily of
- a) phosphates and nitrates
 - b) inorganic substances such as iron oxides
 - c) fermented acids and bases
 - d) organic matter that resists decay.



- v) Renewable resources are those resources
- a) that can be recycled
 - b) that are used for the increase in biomass
 - c) that participate in the sulfur cycle of life
 - d) that are transported in natural waterways.
- vi) The major product of the process of ammonification occurring in the soil is
- a) urea
 - b) amino acids
 - c) ammonia
 - d) protein.
- vii) Bacteria species of Thiobacillus and Beggiatoa play an important role in the
- a) Water cycle on the earth
 - b) Phosphorus cycle
 - c) Sulphur cycle in the soil
 - d) breakdown of sewage.
- viii) The BOD helps determine the
- a) extend of pollution in wastewater
 - b) filtering capacity of the soil
 - c) number of bacteria in 100 ml solution of bacteria
 - d) types of biota in the ecosystem.



- ix) One of the first steps in wastewater treatment is
- a) addition of chlorine
 - b) addition of hydrogen sulphide
 - c) removal of particulate matter
 - d) addition of phosphorus to the water.
- x) One of the purposes of secondary treatment of water is
- a) increase the chlorine content
 - b) reduce the BOD
 - c) encourage the formation of PCBs
 - d) discourage ammonification.
- xi) Chlorine gas is used to maintain
- a) a low microbial content in water
 - b) the development of particulate matter in primary sewage treatment
 - c) the development of humus of the soil
 - d) the purity of a slow soil filter.
- xii) The membrane filter is used for the detection of bacteria in the water because
- a) it kills unwanted bacteria
 - b) it provides nitrogen for the development of bacteria
 - c) bacteria filters perform on it
 - d) it can be used to remove chlorine from the water.



xiii) In the processes of water bacteriology gene probes can be used to locate

- a) PCBs in water
- b) nitrate ions in water
- c) decaying trees in water
- d) DNA fragments of microorganisms in water.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. Briefly describe the process of IAQ.
- 3. How the soil surface run off is a parameter for water pollution ?
- 4. State about the microbial community of surface and subsurface soil environment.
- 5. What is asymmetric RO membrane (for desalination operation) ? Explain the basic mechanism of RO based separation operation. $2 + 3$
- 6. Describe briefly about the possible impact of global warming.
- 7. What are the reasons behind ozone hole formation ?

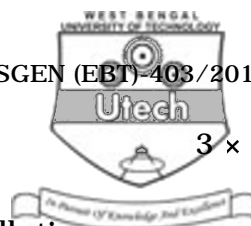


GROUP – C

(Long Answer Type Questions)

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

8. Draw the oxygen sag curve in a river exposed to industrial effluents. How in the laboratory BOD is measured ? Compare between BOD and COD. $5 + 5 + 5$
9. Define biodiesel. State the method of biodiesel production in industry. Write about the current worldwide status of biodiesel. $2 + 8 + 5$
10. In which way do industrial wastes pollute the environment (water, soil, air) ? What strategies should be taken to combat this pollution ? $9 + 6$
11. State about the greenhouse gases and their main anthropogenic sources. How greenhouse gases are related with global climatic changes ? $10 + 5$
12. In which context biogas is the best alternative to fossil fuels ? Explain the basic principles of separation operations in down stream processing of bio-fluids. How will you differentiate IIM than wild types, by its mutagenic and hybrid genetic properties ? Describe in details the importance of 'Hybrid' strain compared to a 'Mutant' in yield based production and in Reactor design. $5 + 5 + 5$



13. Justify the following statements :

3 × 5

- a) Lichens are reliable monitors of air pollution
- b) MBST is cost effective separation technology
- c) TGGE is the best in assessing microbial diversity.

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