

Seat No. : \_\_\_\_\_

# AK-126

April-2022

B.Sc., Sem.-VI

CC-310 : Biotechnology

(Environmental Biotechnology)

(New Course)

Time : 2 Hours]

[Max. Marks : 50

- Instructions :**
- (1) Draw figures wherever necessary.
  - (2) Show question number against each answer.
  - (3) Figures in right are marks.
  - (4) Answer any **three** out of initial **eight** main questions. Question **9** is compulsory.

## Section – I

1. (A) Discuss the treatment of solid waste material by Composting. 7  
(B) Explain the treatment of liquid waste by fixed film treatment process. 7
2. (A) Discuss the process of treatment of waste water by activated sludge process. 7  
(B) Discuss the standards and testing of drinking water. 7
3. (A) Discuss Bioremediation of contaminated soil. 7  
(B) Discuss the types of recalcitrant Xenobiotic compounds and list its hazards. 7
4. (A) Discuss the Bioremediation of Heavy metals. 7  
(B) Discuss the abatement and control of Biomedical waste. 7
5. (A) Discuss Bioleaching of metals with a suitable example and list its advantages. 7  
(B) Explain the production of Methane and list the factors affecting it. 7
6. (A) Discuss the recovery of Copper using Biometallurgy. 7  
(B) Discuss the process for enhanced recovery of Oil using microorganisms. 7

7. (A) Discuss Global warming and list the measures adopted to control Green-house effect. 7
- (B) Discuss the stratospheric ozone depletion. 7
8. (A) Discuss the elements and process of risk assessment. 7
- (B) Discuss the microbial control of algal blooms and integrated pest management. 7
9. Answer in short : (Any **Eight**) 8
- (1) What are Biofilms ?
  - (2) What are the benefits/uses of landfill sites ?
  - (3) What is Bioventing ?
  - (4) List the consequence of disposing untreated waste water in natural water bodies.
  - (5) Define : Vermicomposting
  - (6) Give the role of IMViC test in environmental biotechnology.
  - (7) List any two hazards of landfills.
  - (8) Define : BOD.
  - (9) What is Lagooning ?
  - (10) What is recalcitrant ?
  - (11) List any three green-house gases and their source.
  - (12) Define : Eutrophication.
  - (13) Give an example of the bacterium used to clear oil spills.
  - (14) "COD values are higher than BOD values." Comment.
  - (15) What are the consequences of acid rain on human health ?
  - (16) Define : TDS.
  - (17) Give two examples of denitrifying bacteria.
  - (18) What are the approaches through which biotechnology contributes to environmental sustainability ?
  - (19) List the components used for the production of Hydrogen.
  - (20) Define : Biosorption.
  - (21) Give an example of microbe used to remove heavy metals.
  - (22) List the measures to control acid rain.
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1. (A) Discuss the relationship between molecular structure and Biodegradability giving suitable examples. 7  
(B) Explain abatement of harmful wastes by Bioventing and Bioslurping. 7
2. (A) Describe material prone to biodeterioration and means to control it. 7  
(B) List heavy metals acting as pollutant and explain its sources and harmful effects. 7
3. (A) Discuss various methods for solid waste treatment and give its importance. 7  
(B) Describe methods for testing drinking water. 7
4. (A) Describe Indian standards for safe drinking water. 7  
(B) Explain treatment of liquid waste by activated sludge process. 7
5. (A) Explain principle of microbial leaching and describe popular designs for mining by leaching. 7  
(B) Discuss biotechnological uses of Cellulose and Lignins as substrate. 7
6. (A) Explain sources and advantages of Methane and Hydrogen fuels. 7  
(B) Discuss principle of Microbially-enhanced Oil Recovery. 7
7. (A) Write a detailed note on Environmental Impact Assessment. 7  
(B) Explain harmful effects and controls of Sea-weed and algal blooms. 7
8. (A) Describe the sources of Green-house gases and its harmful effects. 7  
(B) Summarize importance of biodiversity and means to conserve it. 7

9. Answer the following : (Any **Eight**)

**8**

- (1) The bioremediation technique includes contaminated solid materials + microorganisms + water formulated into slurry is called
  - (A) Aerated lagoons
  - (B) Low -shear airlift bioreactor
  - (C) Fluidized- bed soil reactor
  - (D) All of these
- (2) At this stage of waste water treatment, settle sewage is formed
  - (A) Preliminary treatment
  - (B) Secondary treatment
  - (C) Primary treatment
  - (D) Sludge treatment
- (3) During tertiary waste water treatment, phosphate is usually removed by
  - (A) Filtration
  - (B) Precipitation using lime or alum
  - (C) Lagooning
  - (D) Slow sand filters
- (4) Microorganisms can remove metals by which of the following mechanism ?
  - (A) Adsorption and precipitation
  - (B) Complexation
  - (C) Volatilization
  - (D) All of these
- (5) \_\_\_\_\_ approach promotes biodegradation by stimulating indigenous microorganisms' growth at the contaminated site.
  - (A) In situ intrinsic bioremediation
  - (B) In situ engineered bioremediation
  - (C) Ex situ intrinsic bioremediation
  - (D) Ex situ engineered bioremediation
- (6) Bioslurping in situ bioremediation technology includes
  - (A) Soil washing + vitrification
  - (B) Bioventing + vacuum enhanced pumping
  - (C) Land farming
  - (D) Soil vapour extraction
- (7) \_\_\_\_\_ are the most common contaminants found in hazardous sites according to EPA
  - (A) PCBs
  - (B) Heavy metals
  - (C) VOCs
  - (D) All of these
- (8) Carrots are used to absorb DDTs can be explained by \_\_\_\_\_ phytoremediation technique.
  - (A) Rhizofiltration
  - (B) Phyto stabilization
  - (C) Phytoaccumulation
  - (D) Phytovolatilization
- (9) Bioleaching can be defined as
  - (A) Metals are dissolved from ore bearing rocks using microorganism.
  - (B) Recovery of low-grade ores which cannot be economically processed with chemical methods.
  - (C) Both (A) and (B)
  - (D) None of these