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No. of Printed Pages: 2

Sardar Patel University
M.Sc. IV Semester Biotechnology
PS04CBIT02 (Environmental Biotechnology)

Date: 03/12/12

Max Marks: 70

Time: 10:30am to 1:30pm

Attempt all questions

Q.1 Select the most appropriate answer from the following **1×8**

- I. Oxygen distribution in activated sludge floc from outside to inside
 - a. Aerobic zones – Anaerobic zone – Strictly anaerobic
 - b. Anoxic – Aerobic – Strictly anaerobic
 - c. Strictly anaerobic – Anoxic – Aerobic
 - d. None of the above

- II. What indicates the value of F/M ratio in activated sludge process
 - a. Inorganic load
 - b. Organic load
 - c. Oxygen content
 - d. No. of microorganisms

- III. Which of the following is/are main test used for the determination of organic matter in waste water
 - a. BOD
 - b. TOC
 - c. COD
 - d. All of the above

- IV. Autotrophic bacteria such as nitrifying bacteria require oxygen to oxidise NH_4^+ to nitrate. The oxygen demand exerted by these bacteria is called
 - a. BOD
 - b. NOD
 - c. COD
 - d. TOC

- V. Which of the following is not a filamentous microorganism
 - a. *Nocardia*
 - b. *Type O21N*
 - c. *Type 1701*
 - d. *Pseudomonas*

- VI. In which crop *Azolla* is used as most valuable fertilizer
 - a. Rice
 - b. Corn
 - c. Wheat
 - d. Bazra

- VII. Addition of microorganism (indigenous or exogenous) to the contaminated site for bioremediation is known as
 - a. Biosparging
 - b. Bioaugmentation
 - c. Bioventing
 - d. Biopiles

- VIII. Which of the following microorganism is used for iron leaching from its ore
 - a. *Thiobacillus*
 - b. *Candida*
 - c. *Pseudomonas*
 - d. *Aspergillus*

Q.2 Attempt any seven of the following and describe in brief **2×7**

- I. Sludge bulking
- II. Phytoremediation
- III. Trickling filters
- IV. Vermicomposting
- V. Differentiate BOD and COD
- VI. UASB
- VII. Bio-scrubber
- VIII. oxidation ditches
- IX. Define the term F/M ratio, Pin point floc and filamentous floc.

- Q.3 A. Describe different **fixed film technologies** for the waste water treatment. - 06
 B. Write principles of **biological wastewater treatment** processes. Explain primary, secondary and tertiary treatment of waste water. 06
- OR
- B. Discuss biochemistry and microbiology of **inorganic phosphorus removal** from waste water. 06
- Q.4 A. Explain microbiology of **anaerobic waste water treatment** systems. 06
 B. Discuss the potential of various **nitrogen fixing microbial inoculants** in promoting plant growth. Describe any one in details. 06
- OR
- B. Write a note on **in situ bioremediation**. 06
- Q.5 A. Discuss how **GMOs** can help in **bioremediation**. Explain citing any one example. 06
 B. Write details on environmental impact of **azo dye biodegradation**. 06
- OR
- B. Write notes on **biosorption** of heavy metals. 06
- Q.6 A. Write in detail on organism/s, mechanism and process of **bioleaching** of any one valuable metal from its ore. 06
 B. Describe the microbial removal of **inorganic and organic sulphur** from coal and discuss its environmental impact. 06
- OR
- B. Discuss the mechanism of microbial stimulation of **oil recovery**. 06

ALL THE BEST