



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program :Seventh Semester – 2020

Paper: Biodegradation and Bioremediation

Course Code: BOT-407

Part – I (Compulsory)

Time: 15Min. Marks: 10

Roll No. in Fig.

Roll No. in Words.

Attempt this Paper on this Question Sheet only.

Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Signature of Supdt.:

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)

- i. The use of living organisms to degrade environmental pollutants is known as
 - a. Microremediation
 - b. Nanoremediation
 - c. Bioremediation
 - d. All of these
- ii. Microorganisms remove metals by
 - a. Adsorption
 - b. Complexion
 - c. Precipitation
 - d. All of these
- iii. A non-directed physio-chemical interaction between heavy metals and surface of microorganisms is called
 - a. Biotransformation
 - b. Bioaccumulation
 - c. Biomagnifications
 - d. Biosorption
- iv. Which of the following have not been used for bioremediation?
 - a. Aerobic Bacteria
 - b. Plants
 - c. Filamentous Fungi
 - d. Viruses
- v. Generally, enzymes which can transform organic pollutants are
 - a. Specific
 - b. Have high molecular weight
 - c. Non-specific
 - d. Resistant to hightemperature
- vi. When genes from different organisms are brought together in single organism to form specific metabolic pathway, the technique is known as
 - a. Rational approach
 - b. Directed evolution
 - c. Bioaugmentation
 - d. Biostimulation
- vii. Biological treatment of sewage by microorganisms (mainly decomposers) would most likely occur at which stage of waste water treatment?
 - a. Primary
 - b. Secondary
 - c. Tertiary
 - d. Advanced
- viii. Which of the following waste water treatments is most likely to produce carcinogens as a byproduct?
 - a. Chlorination
 - b. Ultraviolet light (UV)
 - c. Sand filtration
 - d. Carbon filtration
- ix. The enzyme nitrogenase would most likely be round in:
 - a. Nitrifying bacteria
 - b. Denitrifying bacteria
 - c. Nitrogen fixing bacteria
 - d. Nitrogenase bacteria
- x. A major organism used in commercial bioleaching for copper recovery is
 - a. Desulfobivrio desulfuricans
 - b. *Pseudomonas aeruginosa*
 - c. *Aspergillus niger*
 - d. *Thiobacillus ferrooxidans*



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers of the following: (10x2=20)

- i. What is meant by ACCLIMATION? Which factors can affect ACCLIMATION?
- ii. Why RECALCITRANT molecules are difficult to degrade? Why are they considered harmful for ecosystem?
- iii. What is meant by BIOREACTOR-BASED method of BIOREMEDIATION?
- iv. What is meant by SCREENING of microorganisms? Why it is done?
- v. Enlist the traditional approaches of pollution control.
- vi. Differentiate between BIODEGRADATION and BIOREMEDIATION.
- vii. Describe the process of SORPTION and its effects on BIODEGRADATION.
- viii. What is CATABOLIC PLASMID?
- ix. What is ACTIVATION? Enlist mechanisms involve in ACTIVATION.
- x. What are XENOBIOTIC compounds? How can they enter in our environment?

Answers the following questions. (3x10=30)

- i. Describe different strategies used for bioremediation with special emphasize on Genetic Approach. (10)
- ii. a. Write down the effects of metals and radionuclides on environment. (05)
b. Sometimes pollutants are not available to microorganisms for degradation. Give possible causes for this non-bioavailability. (05)
- iii. a. Describe enrichment and enrichment strategies. How will you design enrichment strategy isolate oil degrading bacteria? (05)
b. Write a note on biocatalyst selection for bioremediation. (05)