[182] SEAT No._____ No. of Printed Pages: 02

(182)

SARDAR PATEL UNIVERSITY

M. Sc. -Integrated Biotechnology – Eighth Semester Examination

Wednesday, 27th March 2019

Time: 02:00 pm to 05:00 pm

PS08CIGIB4: Biodegradation and bioremediation

Q.1 **Mark the right answer of following questions.** **Total Marks – 70** **[08]**

1. The process converting environmental pollutants in to harmless products by naturally occurring microbes is called _____.
   a. Intrinsic bioremediation
   b. Extrinsic bioremediation
   c. Biosparging
   d. Phytoremediation
2. _____ transformation process is involved in griseofulvin degradation.
   a. N-dealkylation b. O-dealkylation c. C-dealkylation d. S-dealkylation
3. Bioaugmentation is the process that involves: _____.
   a. Using plants b. Addition of microbes c. *In-situ* bioremediation d. sludge removal e. b & c
4. _____ type of biosurfactant is generally produced by *Pseudomonas spp.*
   a. Trehalolipids b. Lipopeptides c. Rhamnolipids d. Sophorolipids e. Phospholipids
5. In _____ technique of phytoremediation, pollutants store in shoots of plants.
   a. Phytostimulation b. Phytodegradation c. Phytotransformation d. Phytoextraction
6. Artificial inoculation is required for degradation of _____ compounds.
   a. Very easily degradable
   b. Potentially degradable
   c. Easily degradable
   d. Non-biodegradable
7. _____ compound is used to increase insecticidal properties of DDT and organophosphorus pesticides.
   a. PAHs b. Chlorinated alkanes c. 2,4-D d. PCB e. BTEX
8. Methane monooxygenase is commonly involved in degradation of _____ n-alkanes.
   a. C_1-C_8 b. C_5-C_{16} c. C_{10}-C_{30} d. C_{10}-C_{16} e. >C_{25}-C_{30}

Q.2 **Answer the following questions. (ANY SEVEN OUT OF NINE)** **[14]**

1. Explain sub-terminal degradation pathway of n-alkanes.
2. Write applications and sources of chlorinated alkanes.
3. Differentiate *in-situ* and *ex-situ* bioremediation processes.
4. Write initial transformation processes of PCBs.
5. What are the advantages of phytoremediation process?
6. Write mechanism of biofiltration process.
7. Describe the role of hydrolysis in pesticide transformations.
8. What are the advantages and disadvantages of biofiltration used for removal of air pollutants?
9. Mention degradation pathway of ethylbenzene to benzoyl-CoA.

Q.3 A. What is xenobiotic compounds? Explain determination of biodegradability and factors affecting hydrocarbon degradation. [06]

B. Write short notes on: 1) Anaerobic metabolism of lipids. [03]

2) Degradation of 2,4,5 T [03]

OR

B. Enlist categories of aromatic compounds. Describe any two degradation pathways of toluene. [06]

Q.4 A. Explain β-oxidation cycle. Discuss involvement of β-oxidation in pesticide transformation with appropriate examples. [06]

B. Illustrate oxidative dealkylation of pesticide with suitable examples. [06]

OR

B. Mention some of the facts of chloroalkanes degradations. Write degradation pathways of PCA and CCl_4. [06]

Q.5 A. Define bioremediation. Discuss different *ex-situ* bioremediation technologies in detail. [06]

B. Outline the different methods of *in-situ* bioremediation. [06]

OR

B. Write a note on various techniques of phytoremediation used for contaminated soil treatment. [06]

Q.6 A. Describe special features, strategies and factors of bioremediation. [06]

B. Write a note on methods used for immobilization of microbial cells. [06]

OR

B. Explain the role of biosurfactants in biodegradation process in detail. [06]

----------x----------