

SEAT No. \_\_\_\_\_

No. of Printed Pages: 02

(A-16)

**SARDAR PATEL UNIVERSITY**  
**M. Sc. -Integrated Biotechnology – Eight Semester Examination**  
**Wednesday, 19<sup>th</sup> April 2017**  
**Time: 10:00 am to 01:00 pm**  
**PS08CIGEB4: Biodegradation and Bioremediation**

Total Marks – 70

**Q.1****Mark the right answer of following questions.****[08]**

1. What do you consider to be the most important factor affecting bioremediation?  
a. pH      b. Oxygen      c. Nutrients      d. Microorganisms      e. Temperature
2. Which compounds degrade faster than alkane?  
a. Alkene & alkynes      b. Chlorinated aromatic      c. PAHs      d. Alkenes & aromatic
3. Which of the following is the non-ionic surfactant?  
a. Lecithin      b. Triton X-100      c. SDS      d. Quaternary ammonium salt
4. Which of the gas is generated during incineration of waste gas?  
a. Dioxins      b. SO<sub>x</sub>      c. Dioxenins      d. NO<sub>x</sub>      e. CO<sub>x</sub>      f. None of these
5. β – oxidation of fatty acids \_\_\_\_\_.  
a. Involves production of acetyl coA      c. Feeds in to the TCA cycle  
b. Does not produce ATP      d. All of this
6. Filter bed medium of bio-filter is made up of \_\_\_\_\_.  
a. Compost      b. Peat      c. Soil      d. All of these
7. What happens at each chlorination step?  
a. Chlorine not released, H<sup>+</sup> & protons required      c. Chlorine released, H<sup>+</sup> & protons required  
b. Chlorine released, H<sup>+</sup> & electrons required      d. None of these
8. In anaerobic biodegradation of aromatic compounds the added oxygen is from \_\_\_\_\_.  
a. CO<sub>2</sub>      b. NO<sub>2</sub>      c. H<sub>2</sub>O      d. NO<sub>x</sub>      e. O<sub>2</sub>      f. None of these

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

1. Write cyclohexane degradation pathway.
2. Write advantages and disadvantages of bioremediation.
3. Write examples of microbes and different anaerobic conditions for toluene degradation.
4. Discuss types and role of bio-surfactants in bioremediation.
5. Explain bio-augmentation with suitable examples
6. What are the applications of chlorinated alkanes?
7. What do you understand by microbial community of bio-filter?
8. What are the applications of chlorinated alkanes?
9. Define xenobiotic compounds. Write typical features recalcitrance compound.

- Q.3** A. Give an account on factors affecting biodegradation process. [06]  
B. Write notes on: 1) Determination of biodegradability [06]  
2) Pathway of n-alkane degradation  
**OR**  
B. Which organic pollutants do produce catechol as one of the intermediate? Outline the steps of catechol degradation pathway. [06]
- Q.4** A. Illustrate microbial transformation processes of pesticides by oxidative dealkylation and hydrolysis. [06]  
B. What is 2,4,5-T? Discuss various steps of 2,4,5-T degradation. [06]  
**OR**  
B. Write notes on: 1)  $\beta$  – oxidation process [06]  
2) Different degradation pathways of carbon tetrachloride
- Q.5** A. Explain the *Ex-Situ* bioremediation techniques in detail. [06]  
B. Describe the advantages and disadvantages of *in-situ* bioremediation processes. [06]  
**OR**  
B. What is bio-reactor? Discuss the role of aqueous reactors used in bioremediation with suitable example. [06]
- Q.6** A. Discuss the role of molecular techniques used in bioremediation of branched aromatic hydrocarbons. [06]  
B. How contaminants in gas phase is degraded by bio-scrubber and membrane bioreactor. [06]  
**OR**  
B. Write a note on microbial ecology of bio-filters. [06]

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