

[A-91]

No. of Printed Pages: 02

SC

**Sardar Patel University**  
**M. Sc. Int. Biotechnology, Eighth Semester Examination**  
**Tuesday, 5<sup>th</sup> April, 2016**  
**02:30 p.m. – 05:30 p.m.**

**PS08CIGIB4: Biodegradation and Bioremediation**

**Note:**

1. Figures to the right indicate marks.
2. Draw neat and labeled diagram, wherever necessary.

Q-1 Attempt the followings

[08 X 01 = 08]

1. It is always desirable to treat high organic content waste by
  - a) Aerobic treatment
  - b) Anaerobic treatment
  - c) Both a & b
  - d) None
2. Oxidation reaction occurs in
  - a) Aerobic condition
  - b) Anaerobic condition
  - c) Anoxic condition
  - d) All of these
3. Beta oxidation of aliphatic organic molecule requires
  - a) Alpha & beta carbon substitution
  - b) free alpha carbon
  - c) Both alpha & beta free carbons
  - d) free beta carbon
4. Removal of methyl moiety from pesticide is referred as
  - a) Hydrolysis
  - b) Dealkylation
  - c) Hydroxylation
  - d) Dehalogenation
5. Which of the following bacterium is called as the superbug that could clean up oil spills
  - a) *Bacillus subtilis*
  - b) *Pseudomonas putida*
  - c) *Pseudomonas denitrificans*
  - d) *Bacillus denitrificans*
6. Filter bed medium of biofilter is made up of \_\_\_\_\_
  - a) Compost
  - b) Peat
  - c) Soil
  - d) All
7. Which of the following are zwitterionic surfactants
  - a) SDS)
  - b) Triton X-100
  - c) Lecithin
  - d) Saponin
8. Which of the following is/are low-molecular-weight biosurfactant?
  - a) Surfactin
  - b) lipopeptides
  - c) Emulsan
  - d) Polymer

Q-2 Answer the following questions (**Any seven**).

[07 X 02 = 14]

- i. Describe characteristics of anaerobic bacteria for degradation of organics.
- ii. Classify organic pollutants based on their biodegradability.
- iii. Describe gentisate pathway for non heterocyclic aromatic compounds.
- iv. Explain pesticide degradation briefly.
- v. What is recalcitrant?
- vi. Discuss the advantages of bioremediation technique.
- vii. Differentiate between a biofilter and a bioscrubber.
- viii. What are high molecular weight biosurfactants?
- ix. Explain the air flow in biofilter?

- Q-3 (A) Describe principles of bacterial degradation. [06]  
(B) Explain anaerobic degradation of biopolymers. [06]  
**OR**  
(B) Explain degradation of aromatic organic compound under aerobic conditions. [06]
- Q-4 (A) Write a note on oxidative dehalogenation mechanisms of pesticides. [06]  
(B) Explain degradation of PCBs. [06]  
**OR**  
(B) Write a note on degradation of wood by insects. [06]
- Q5 (A) Discuss the phenomenon of phytoremediation. [06]  
(B) What is biopile technology? Explain in detail. [06]  
**OR**  
(B) Write a note on slurry bioreactors used in bioremediation. [06]
- Q6 (A) Giving an example, explain the role of genetically engineered microorganisms in bioremediation of chlorinated compounds. [06]  
(B) Discuss the materials used for the biofilter media preparation? [06]  
**OR**  
(B) Explain the different steps involved in the biofiltration process. [06]

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