

[67]

**Sardar Patel University****M. Sc. Int. Biotechnology, Eighth Semester Examination****Thursday, 19<sup>th</sup> April, 2018****02:00 p.m. – 05:00 p.m.****PS08CIGEB4: Biodegradation and Bioremediation****Note:**

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

Total Marks: 70

Q-1 Attempt the followings

[08 X 01 = 08]

1. Because of the low reactivity of which bonds, either aliphatic or aromatic, hydrocarbons are usually hard to degrade biologically?
  - a) C-C
  - b) C-H
  - c) C=O
  - d) None
2. \_\_\_\_\_ branching of compound leads to easy biodegradability.
  - a) More
  - b) Less
  - c) Moderate
  - d) None
3. What is meant by Halogenation?
  - a) Introduction of Halogen atom
  - b) Removal of Halogen atom
  - c) Introduction & Removal of Halogen atom
  - d) None of the mentioned
4. The term persistence of a pollutant in the environment refers to the
  - a) Concentration of the pollutant in the environment.
  - b) Distance a pollutant spreads in the environment in a given time.
  - c) Length of time required to disappear from the environment
  - d) Measure of the harm which can cause to humans
5. Which of the following are most commonly used hydrophilic groups in anionic surfactants?
  - a) Carboxylates
  - b) Sulphates
  - c) Phosphate
  - d) All of these
6. \_\_\_\_\_ states that "Increasing liquid phase concentration will always increase the amount of contaminant absorbed".
  - a) Freundlich model
  - b) Langmuir model
  - c) Monad relationship
  - d) Michaelis-Menten equation
7. The organic sulfide is treated very fast by which organisms?
  - a) Algae
  - b) Fungi
  - c) Bacteria
  - d) All of these
8. Which of the following engineered strain is used to remove PCB
  - a) *E. coli*
  - b) *Pseudomonas* sp.
  - c) *C. testosteroni*
  - d) None

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

[07 X 02 = 14]

- i. Briefly explain anaerobic bacteria degradation of S-alkyl compounds.
- ii. Write cyclohexane degradation pathway.
- iii. What is epoxidation? Give its suitable example.
- iv. Write steps of 2,4 D degradation.
- v. Which key initial attacks are reported for alkene compounds degradation?
- vi. Justify the use of Aqueous reactors in bioremediation.
- vii. Give advantages and disadvantages of bioremediation.
- viii. What is synthetic media?
- ix. Differentiate activities of typical aerobic and anaerobic bacteria.

(P.T.O.)

- Q-3 (A) Which enzymes are mainly involved in hydrocarbon degradation? Describe n-alkane and n-alkene degradation pathways. [06]  
(B) Give a brief account on aerobic degradation of aromatic compounds [06]  
**OR**  
(B) Which parameters are used to measure biodegradability? Give an account on factors affecting biodegradation. [06]
- Q-4 (A) Give a brief account on Wood degradation and its mechanism. [06]  
(B) Explain N-dealkylation and C-dealkylation reaction in brief. [06]  
**OR**  
(B) Explain dealkylation, hydrolysis and decarboxylation reactions of pesticide degradation with appropriate examples. [06]
- Q5 (A) Give an brief account on Bioremediation strategies. [06]  
(B) Write short notes on: i) Composting [06]  
ii) Biopile technology  
**OR**  
(B) Elaborate the characteristics and properties of surfactants used for bioremediation purpose. [06]
- Q6 (A) Explain microbial ecology of biofilters in brief. [06]  
(B) How membrane system is used to remove the air pollution? Explain. [06]  
**OR**  
(B) What are the principle approaches to genetically engineered microorganism's development for bioremediation? Discuss any one with suitable example. [06]

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