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(10%)

**SARDAR PATEL UNIVERSITY**  
**M. Sc. -Integrated Biotechnology – Eight Semester Examination**  
**Tuesday, 10<sup>th</sup> April 2018**  
**Time: 02:00pm to 05:00pm**  
**PS08CIGIB1: Applied Environmental Biotechnology**

Total Marks – 70

- Q.1 Mark the right answer of following questions. [08]**
1. Sewage is mainly a \_\_\_\_\_.  
 a. Liquid waste    b. Solid waste    c. Gaseous waste    d. Mixture of solid & Gas    e. All of these
  2. Acid used mostly for removal of milk stone from container of dairy industry is \_\_\_\_\_.  
 a. Nitric acid                      b. Gluconic acid                      c. Tartaric acid                      d. Sulfuric acid
  3. What is the order of waste management hierarchy from most to least favored?  
 a. Prevention-Recycle-Reuse-Disposal    c. Prevention-Disposal-Reuse-Recycle  
 b. Prevention- Reuse- Disposal Recycle    d. Prevention-Reuse -Recycle -Disposal
  4. Sedimentation is physical wastewater treatment process used to remove \_\_\_\_\_.  
 a. Persistent material present in H<sub>2</sub>O                      c. Particles which are less dense than H<sub>2</sub>O  
 b. Particles which are more dense than H<sub>2</sub>O    d. Dissolve particles from H<sub>2</sub>O
  5. Find out effective volume (m<sup>3</sup>) of UASB tank using given data: flow rate is 20m<sup>3</sup>, organic loading is 0.2g/m<sup>3</sup> & influent COD concentration is 10g/m<sup>3</sup>.  
 a. 1000m<sup>3</sup>                      b. 0.4m<sup>3</sup>                      c. 0.1m<sup>3</sup>                      d. 0.001m<sup>3</sup>                      e. 100m<sup>3</sup>
  6. Solvents and surfactants are widely used in \_\_\_\_\_ tannery process.  
 a. Fleshing                      b. Soaking                      c. Degreasing                      d. Delimiting                      e. Pickling
  7. \_\_\_\_\_ range of ammonia concentration not having any harmful effect on anaerobic digestion.  
 a. 200-500mg/l                      c. 1000-2000mg/l  
 b. 500-1000mg/l                      d. 1500-3000mg/l
  8. Find out hydraulic retention time of activated sludge tank using given data: Volume of the tank is 2550m<sup>3</sup>, flow rate is 50m<sup>3</sup> and dilution rate is 10.  
 a. 51h                      b. 0.019h                      c. 5.1h                      d. 510h                      e. None of these
- Q.2 Answer the following questions. (ANY SEVEN OUT OF NINE) [14]**
1. Write general characteristic of wastewater.
  2. Enlist different types of pond treatment processes. Write disadvantages of anaerobic pond.
  3. Give advantages of composting process.
  4. Write advantages of attached growth treatment process.
  5. Write examples of various types of sedimentation tank/clarifier.
  6. Explain solid waste management inverted hierarchy.
  7. What are the limitations of primary and secondary treatment processes?
  8. What are the harmful impacts of polluted water on environment and human?
  9. Explain effects of dairy wastewater on environment.

C.P.T.O.)

- Q.3 A. Outline any six biotechnological methods used for measurement of environmental pollution. [06]  
B. Discuss the process of minimum five components of preliminary and primary treatment processes. [06]

*OR*

- B. Differentiate point & non-point source water pollution. Write a note on water pollution. [06]
- Q.4 A. Discuss operational parameters and pathogen removal techniques of activated sludge process. [06]  
B. Mention disadvantages of trickling filter process with appropriate solution. Give a note on biology of trickling filter treatment process. [06]

*OR*

- B. What is anaerobic decomposition? Explain microbiology of anaerobic wastewater treatment process. [06]
- Q.5 A. Differentiate single and two stage anaerobic digestion. Write a note on factors controlling anaerobic digestion process. [06]  
B. Give an account on physicochemical characterization and decomposition stages of composting process. [06]

*OR*

- B. Write short notes on: A) Advantages & disadvantages of biofuel [06]  
B) Solid waste management

- Q.6 A. Discuss the role of various components/processes of dairy wastewater treatment plant. [06]  
B. Explain primary, secondary and tertiary treatment processes of paper pulp industry ETP. [06]

*OR*

- B. Describe primary, H<sub>2</sub>S removal and chrome recovery processes of tannery wastewater treatment process. [06]

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