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Question Paper Code: 59092

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Elective

Chemical Engineering

15UCH917 - WASTE WATER TREATMENT

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The reduction of disease causing microorganisms by physical or chemical means is called
 - disinfection
 - reclamation
 - recycling
 - repurification
- The residue remaining after a wastewater sample has been evaporated and dried at a specified temperature of 103 to 105°C is called
 - total volatile solids
 - total fixed solids
 - total suspended solids
 - total solids
- The ratio between peak flow rates of wastewater to average long term flow rate of wastewater is called
 - sustained flow
 - peaking factor
 - hydraulic factor
 - retention time
- _____ type reactor is used in chlorine contact basin and natural wastewater treatment system.
 - batch
 - plug flow
 - complete mix
 - fluidized bed

5. The chemical destabilization of particles in wastewater to bring about their aggregation during perikinetic and orthokinetic flocculation is called
- (a) chemical disinfection (b) chemical oxidation
(c) chemical coagulation (d) chemical precipitation
6. In advanced oxidation process _____ is used as strong oxidant to destroy organic constituents in wastewater.
- (a) free hydroxyl radical (b) ozone
(c) chlorine (d) permanganate
7. One of the steps involved in the overall anaerobic oxidation of a waste is
- (a) nitrification (b) de-chlorination
(c) sedimentation (d) methanogenesis
8. The procedure used to increase the solids content of sludge by removing a portion of the liquid fraction is
- (a) digestion (b) thickening
(c) clarification (d) incineration
9. In _____ filtration, the removal of suspended material occurs within and on the surface of the filter bed.
- (a) depth (b) surface
(c) membrane (d) centrifugal
10. An example for naturally occurring ion – exchange material is
- (a) chelating resins (b) phenolic polymers
(c) zeolites (d) bakelite

PART - B (5 x 2 = 10 Marks)

11. What is primary treatment of wastewater? Give examples.
12. List out the components that make up the wastewater flow from a community.
13. Define chemical neutralization. Why it is done in water treatment plants?
14. Summarize the overall objectives of biological treatment of wastewater.
15. What are the advantages and disadvantages of membrane treatment technologies?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the health and environmental concerns in wastewater management and treatment. (10)

(ii) What is wastewater characterization? Discuss its importance. (6)

Or

(b) Describe the various sources of metallic pollutants in wastewater and health hazards produced by metallic impurities. (16)

17. (a) Discuss the principle types of reactors used for the treatment of wastewater. (16)

Or

(b) Explain the important factors that must be considered when evaluating and selecting unit operations and processes for wastewater treatment. (16)

18. (a) Describe the mechanism involved in the removal of pollutants from wastewater by: chemical coagulation and chemical precipitation. (16)

Or

(b) Explain the operating principle of dry chemical feed system and liquid chemical feed system for wastewater treatment. (16)

19. (a) With a neat sketch discuss the characteristics, working principle and applications of trickling filter. (16)

Or

(b) (i) Describe the process for the treatment and disposal of solid wastes by aerobic digestion method. (8)

(ii) What is incineration? List out the advantages, disadvantages and various methods of incineration. (8)

20. (a) Identify the advanced technologies used for the removal of organic and inorganic colloidal and suspended solids and explain their working principle. (16)

Or

(b) With neat sketch, explain the filtration process principle and particle removal mechanism in depth filtration. (16)

