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**Question Paper Code: 94104**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Fourth Semester

Civil Engineering

19UCE404 - Waste water Engineering

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The liquid waste originating from residential and industrial buildings, are collectively called: CO1- U  
(a) Domestic sewage    (b) Combined    (c) Sanitary    (d) none of these
2. The flow velocity in a sewer does not depend on: CO1-U  
(a) its grade    (b) its length    (c) its hydraulic mean depth    (d) its roughness
3. What are the methods adopted for disposal of screenings? CO1-U  
(a) Burning    (b) Burial    (c) Dumping    (d) all the above
4. In drum type screen, which axis does the drum rotate? CO1-U  
(a) Horizontal    (b) Vertical    (c) Irregular    (d) Horizo-vertical
5. \_\_\_\_\_ in trickling filter contains many species like bacteria and round worms CO1-U  
a) Treated water    b) Wastewater    c) Bio-film    d) Air influent
6. The waste stabilization ponds can be CO1-U  
(a) aerobic    (b) anaerobic    (a) facultative    (d) all the above
7. The most important type of species involved in the degradation of organic matter in Biological Treatment Processes CO1-U  
(a) Photoautotrophs    (b) Chemo-heterotrophs  
(c) Photo-heterotrophs    (d) Chemo-autotrophs

8. In a batch system, maximum growth rate is observed in CO4- App  
 (a) Log phase                      (b) Lag phase                      (c) Decay phase                      (d) maturation phase
9. The pH range for proper functioning of sludge digestion tank is CO1- U  
 (a) 3.5                      (b) 4-5                      (c) 6.5-8.5                      (d) above 10
10. What is the term used for reuse of sewage sludge? CO1- U  
 (a) Compost                      (b) Solids                      (c) Bio solids                      (d) Sludge

PART – B (5 x 2= 10 Marks)

11. What is meant by Population Equivalent? CO1- U
12. Draw a layout of septic tank. CO1- U
13. Draw the layout of activated sludge process. CO1- U
14. List out the different stages in anaerobic process. CO1- U
15. Enlist the factors affecting sludge digestion process. CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) A sewer system has to be laid for a developing city. For effective functioning of this system, suggest the different sewer appurtenances with neat sketch. CO3- Ana (16)  
 Or
- (b) A sewage treatment plant has to be set up for a city. Discuss about the various treatment options involved in this with neat sketch. CO3- Ana (16)
17. (a) Design the dimensions of a septic tank for a small colony of 500 persons provided with an assured water supply at a rate of 120 lpcd. Also design soak well for effluent discharge, rate of percolation is 1250 l/m<sup>3</sup>/day. Assume relevant data in design. CO2- App (16)  
 Or
- (b) Illustrate with diagram about the principle, construction details and process involved in design of CO2- App (16)  
 (i) Screening  
 (ii) Grit chamber
18. (a) Explain in detail about construction and operation of oxidation pond with neat sketch. Along with its merits and demerits. CO4-App (16)

Or

- (b) It was decided to set up a rotating biological contractor (RBC) to treat sewage in industry. Give clear details about the design requirements, construction process, merits and demerits of the process. CO4-App (16)
19. (a) With a neat sketch, elaborate Anaerobic digestion process CO4- App (16)  
Or  
(b) Outline the concept of constructed wetlands. Classify its types and applicability. CO4- App (16)
20. (a) Domestic sewage has been discharged into river. The quality of water has been degraded. Discuss about the concept of self-purification with the various natural factors. CO2- App (16)  
Or  
(b) Many industries produce sludge at different levels of treatment. If managed properly sludge can be reused for varied purposes. Illustrate sludge management concept to reduce sludge wastage. CO2- App (16)

