Register Number: ……..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Sixth Semester

CIVIL ENGINEERING

CEE117: Environmental Engineering - II

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Sedimentation aided by coagulation is adopted
   a) Almost everywhere b) where biological treatment is to follow next
   c) When industrial wastes are blended with sanitary sewage d) when phosphates are less in sewage
2. A high rate biological treatment unit has a F/M ratio of
   a) Less than 0.1 b) 0.2 to 0.5
   c) 0.1 to 1 d) greater than 1
3. Biological layer sticking to the trickling filter media consists of
   a) Bacteria b) protozoa
   c) bacteria and algae d) bacteria, protozoa and fungi
4. In Grit chamber two usual range of detention time is
   a) 45 sec to 90 sec b) 2 min to 5 min
   c) 20 min to 30 min d) 2 hours to 4 hours
5. Velocity of flow in a sewer should be between
   a) 0.6 m/sec and 3 m/sec b) 2 m/sec and 10 m/sec
   c) 30 cm/sec and 90 cm/sec d) 30 m/sec and 90 m/sec
6. An ideal crop for sewage irrigation is
   a) potato b) beans
   c) sugarcane d) banana
7. The Natural method of rental disposal is sewage
   a) Dilution b) Sewage farming
   c) composting d) lagooning
8. Anaerobic sludge digestion mainly yields
   a) methane b) hydrogen sulphide
   c) ammonia d) carbon dioxide

9. Soil stack collects liquid waste from
   a) baths b) sink and washbasins
   c) urinals d) toilets
10. Waste stack collects waste waters from
   a) toilets and urinals b) washbasins and baths
   c) urinals and kitchens d) any room

PART B (10 x 2 = 20 Marks)

11. What is dry weather flow?
12. Why ventilation of sewer is necessary?
13. State the requirements of waste water before its disposal into water natural bodies?
14. List out the waste water treatment units for primary treatment.
15. What is eutrophication?
16. What is sullage?
17. Where the separate system of waste collection is suitable?
18. What is the role of algae in waste stabilization ponds?
19. What is the use of return sludge in activated sludge process?
20. What is outfall sewer?

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the rational method of estimations of storm water Quantity. (7)

    (ii) A circular sewer is to be laid for draining the storm water from an area of 20.2 ha. Length of the sewer from its head to the point of discharge is 690 m and the available fall is 1.2 m. Using the rational method for the design of storm water sewers, calculate the size of the sewer at the point of discharge. The following data may be used: (7)
    i) runoff coefficient = 0.50
    ii) time of entry = 2 min
    iii) formula to be used for the velocity in sewer = $83.5\ m^{2/3}\ i^{1/2}$
    iv) R=760/t+10

(OR)

    b) (i) What do you understand the terms, self cleaning velocity and limiting velocity in sewers? (4)

    (ii) Find out the size of a circular sanitary sewer to serve a population of 50000. Sewage flow is at 180 lpcd. Natural slope of the ground is 1 in 1250. Ratio of maximum to the average hourly flow is 2.25. (10)

22. a) (i) Comment on the statement (7)
Septic tanks can only be considered as a primary and secondary treatment of a waste is necessary?

(ii) What secondary treatment would you propose for such an installation where following underground strata are available? Dry sandy soil with water table 2 to 3 m below ground level. Illustrate with sketches. (7)

(OR)

b) Sketch and describe the working of a standard rate trickling filter for purification of sewage. What are the preliminary treatment the sewage has to undergo before it can be treated by the filter and why? Describe the biological changes that take place in the filter bed

23. a) (i) What are the treatment technologies used for advanced waste water treatment? (4)

(ii) What are the treatment methods unifasce for phosphate removal from waste water treatment? (10)
Explain anyone.

(OR)

b) (i) Explain the working principles of UASB reactors. (7)

(ii) What are the advantages and disadvantages of UASB reactors? (7)

24. a) How does the self purification of a stream occur. when it has been polluted by the discharge of waste on if? Describe in detail the various stages of self purification, stating the characteristics of each stage.

(OR)

b) Describe the changes which take place when sludge undergoes digestion. What are the various factors controlling sludge digestion?

25. a) Explain the one and two pipe system of plumping and state the condition under which one is suitable to the other.

(OR)

b) Explain what requirements are generally considered necessary in the economical planning and designing of drainage of buildings. Briefly state the points to be kept in mind while determining a suitable layout of the pipe system, the pipe sizes and their ruling gradients.

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