KUMARAGURU
college of technology
character is life

B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2014)

Sixth Semester

CIVIL ENGINEERING

U14CET603**:** Waste Water Engineering

COURSE OUTCOMES

CO1: Design sewerage systems

CO2: Choose suitable pumps for discharge of sewage

CO3: Design the various unit operations for waste water treatment

CO4: Design the sludge treatment and disposal methods

CO5: Perform quality analysis of sewage the characteristics and composition of sewage, self Purification of streams.

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

Answer all the Questions:-
PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code   CO3   [K_2]

List I	List II
A.F/M ratio	i. Trickling filter
B. Effluent Recirculation	ii. Anaerobic digester
C. Energy recovery	iii. Activated sludge process
D. Symbiosis	iv. Oxidation pond

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

2. The final stage of self purification process in a stream is   CO5   [K_1]

   a) Zone of active decomposition   b) Zone of clear water

   c) Zone of recovery   d) Zone of degradation

3. Bio-chemical oxygen demand (BOD) for the first 20 days in generally referred to   CO5 [K$_1$]

    1. Carbonaceous demand

    2. Initial stage demand

    3. Final stage demand

    4. Non carbonaceous demand

a) 1,3   b) 1,4

c) 1,2   d) 2,3

4. The recommended detention period for grit chambers is   CO3 [K$_1$]

a) 1 minute   b) 2 minutes

c) 3 minutes   d) 5 minutes

5. Assertion (A): Discharging the effluents from the oxidation ponds just up-stream of lakes or   CO3 [K$_2$]
reservoirs is undesirable.

Reason (R): The discharged algae get settled in the reservoirs and cause anaerobic

decomposition and destroy water qualities.

a) Both A and R are Individually true and   b) Both A and R are Individually true but
    R is the correct explanation of A   R is not the correct explanation of A

c) A is true but R is false   d) A is false but R is true

6. House connections to the laterals is generally made by   CO1 [K$_1$]

a) R.C.C   b) P.C.C

c) Cast Iron   d) Glazed stoneware

7. The correct order of sludge digestion process is   CO4 [K$_1$]

    1. Acid regression

    2. Acid fermentation

    3. Ripened Sludge

    4. Alkaline fermentation

a) 2-1-4-3   b) 1-3-2-4

c) 3-4-2-1   d) 4-1-3-2

8. The commonly used pumps for pumping sewage is   CO2 [K$_1$]

a) Reciprocating pump   b) Gear pump

c) Centrifugal pump   d) Submersible pump

9. Assertion (A): A free board of 0.3 m is provided above the top sewage line in septic tanks.   CO3 [K₂]

Reason (R): It helps to accommodate the scum in the septic tank.

    a) Both A and R are Individually true and R is the correct explanation of A   b) Both A and R are Individually true but R is not the correct explanation of A

    c) A is true but R is false   d) A is false but R is true

10. The suitable cross-section of sewers to carry combined flow is   CO1 [K₁]

    a) circular   b) Egg shaped

    c) rectangular   d) trapezoidal

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. State the effluent standards for any two parameters recommended by Tamil Nadu Pollution Control Board.   CO5 [K₁]

12. Write the rational formula for estimating storm runoff.   CO1 [K₁]

13. Distinguish between self cleaning velocity and non- scouring velocity.   CO1 [K₄]

14. What do you understand by sewer appurtenances?   CO2 [K₂]

15. List the factors to be considered while selecting a pump for pumping sewage.   CO2 [K₂]

16. Compare the process of operation in a sedimentation tank and septic tank.   CO3 [K₄]

17. What are the operational troubles in trickling filter?   CO3 [K₂]

18. Name any two advanced technologies for sewage treatment.   CO3 [K₁]

19. Define sewage sickness. How it could be avoided?   CO4 [K₁]

20. What do you mean by oxygen sag curve?   CO5 [K₂]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Explain the various sources of wastewater and also discuss the physico-chemical characteristics of wastewater.   CO5 [K₂]

22. State the objectives of sewage treatment and disposal. Suggest a suitable process to treat the wastewater produced from an academic intuition.   CO1 [K₃]

23. State the principles to be observe while preparing drainage plan of a building. Also explain various systems of sanitary plumbing.

CO1 [K2]

24. Design a primary sedimentation tank to treat an average sewage flow of 5000 m^3/day, Take Detention time as 6 hours, L/B ratio as3:1 free board 0.30m and apply the usual check for the design.

CO3 [K6]

25. Draw a process layout of a conventional ASP plant for domestic sewage treatment. Also, discuss the various operational parameters influencing the system.

CO3 [K2]

26. Name the various actions involved in the self-purification process of a stream and explain briefly.

CO5 [K2]

27. With the help of flow chart explain various processes involved in sludge treatment and disposal. Explain the mechanism of anaerobic and aerobic sludge digestion with their relative merits and demerits

CO4 [K2]

****