Total No. of Questions : 12]

SEAT No. :

**P2821**

[Total No. of Pages : 3

# [5354] - 1
# B.E. (Civil) (Semester - I)
## ENVIRONMENTAL ENGINEERING - II
## (2008 Pattern)

*Time : 3 Hours]* *[Max. Marks : 100*

***Instructions to the candidates:***

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat figures wherever necessary.***
4) ***Assume necessary data.***
5) ***Use of scientific calculator is allowed.***

***Q1)*** a) What is TOC, COD and BOD? Explain relationship between them. **[6]**

b) What is dry weather flow? What are the sources of it? State the factors affecting dry weather flow. **[4]**

c) State various formulae used for computing velocity of flow in sewer. **[6]**

OR

***Q2)*** a) Enlist factors to be considered while selecting sewer material. Explain concrete sewers. **[6]**

b) Define self cleansing velocity and explain its importance in sewer design. **[4]**

c) Mention Physical, chemical and biological characteristics of sewage. **[6]**

***P.T.O.***

***Q3)*** a) What are the different types of velocity control devices used in grit chamber? Explain any two with neat sketch. **[4]**

b) B.O.D. of a sewage incubated for one day at 30ºC has been found to be 150mg/l. What will be its 5 day 20ºC BOD, if K at 30ºC is 0.16 per day (base 10). **[6]**

c) Explain screening with respect to : **[6]**

i) Necessity.

ii) Types of screen.

OR

***Q4)*** a) Draw and explain of Process flow diagram for sewage treatment. **[6]**

b) Determine the BOD of river mix on the downstream of point of disposal if sewage of 4MLD, having $BOD_5$ of 240 mg/lit is discharged in a river. The discharge in the river is 0.4 $m^3/s$ having $BOD_5$ of 3mg/lit. **[5]**

c) Write down Streeter-Phelps equation and explain its terminology. **[5]**

***Q5)*** a) Write Short Note : Important microorganisms in waste water treatment system. **[6]**

b) Define : **[6]**

i) Sludge Volume Index (SVI).

ii) Return sludge ratio.

c) Explain the working of rotating biological contactors. **[6]**

OR

***Q6)*** a) Define : **[6]**

i) Sludge bulking.

ii) Mean cell residence time.

b) Write short note on rotating biological contactors. **[6]**

c) Give the merits & demerits of conventional trickling filter. **[6]**

***Q7)*** a) Write short note on : Phytoremediation technology for wastewater treatment and root zone cleaning system. **[8]**

b) Explain the principle of working of aerated lagoon. Also state the merits and demerits over aerated lagoon. **[8]**

OR

***Q8)*** a) Differentiate between oxidation pond and aerated lagoon, with reference to HRT, organic loading method of aeration and operation cost. **[8]**

b) Write short note : Principle, types, advantages & disadvantages of oxidation pond. **[8]**

***Q9)*** a) Write short note on UASB - Principal, advantages and disadvantages. **[6]**

b) Explain steps involved in design of septic tank. **[6]**

c) Explain factors governing anaerobic digestion. **[6]**

OR

***Q10)*** a) Explain septs involved in anaerobic digester. **[6]**

b) What are the method of treatment & disposal of septic tank effluent? **[6]**

c) Explain methods of sludge treatment and disposal. **[6]**

***Q11)*** Give the range of important characteristics of waste water from following industry and draw a suitable flow diagram for treatment for each industry. **[18]**

a) Textile industry.

b) Paper and pulp industry.

c) Distillery industry.

OR

***Q12)*** Give the range of important characteristics of waste water from following industry and draw a suitable flow diagram for treatment for each industry. **[18]**

a) Distillery industry.

b) Sugar industry.

c) Dairy industry.