Total No. of Questions : 10]

SEAT No. :

P2398

[Total No. of Pages : 3

[5253]-110

T.E. (Civil)

ENVIRONMENTAL ENGINEERING - I

(2012 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Enlist various methods for control of gaseous pollutants. Explain anyone. **[6]**

b) Explain the following terms : **[4]**

i) Noise

ii) Wave length of sound

iii) Threshold of hearing

iv) Sound.

OR

Q2) a) River water supply is treated by the sequence of unit operations, draw flow sheet for the same and state the purpose or purposes of the each unit process. **[8]**

b) Discuss the factors affecting the design period. **[2]**

Q3) a) Explain with a neat sketch various types of settling observed during sedimentation. **[6]**

b) Mention the types of Aerators and also write down the objectives of aeration. **[4]**

OR

P.T.O.

Q4) a) Explain Tube settler with a neat sketch. **[6]**

b) Discuss various physical characteristics of water. **[4]**

Q5) a) What is coagulation? Mention various factors affecting coagulation. Write chemical reactions of any three coagulants with water. **[8]**

b) Calculate the dimensions of Rapid sand filter for one lakh population with 150 liter/capita/day of water supply. Filtration rate equal to 100 liter/min/m^2 and mean size of sand is 1.5 mm. Find the depth of sand bed for head loss of 2.0 m if break through index is 0 .002. **[8]**

OR

Q6) a) Enlist and explain various operational troubles in rapid sand gravity filter and also remedial measure for the same. **[8]**

b) A water treatment plant is to treat a design discharge of 65.0 MLD. It has paddle fiocculators 24m long, 15m wide and 4m deep. It is fitted with four horizontal shafts to which revolving paddles are attached which rotates at 1.5 rpm. Each shaft supports 4 paddles which are 14m long, 20cm wide and centered 1.5m from the shaft. Using mean velocity of flow of water as 30% of the paddle velocity, temperature of water = 20°c and Cd = 1.9. **[8]**

Determine :

i) difference in velocity between paddle and water

ii) mean velocity gradient

iii) detention time.

Q7) a) Compare Lime soda process with Zeolite process by considering various points. **[8]**

b) A raw water sample contains the following impurities **[8]**

$CaCO_3$ = 200 mg/l	$MgC1_2$ = 15 mg/l
$Mg(HCO_3)_2$ = 120 mg/1	$MgSO_4$ = 100 mg/l
$CaSO_4$ = 100 mg/l	NaC1 = 25 mg/l
Fe_2O_3 = 40 mg/l	SiO_2 = 30 mg/1

Compute the annual requirement of slaked lime and soda, for treating the 80000 lit/day of water .The purity of slaked lime is 85%.

OR

Q8) a) Discuss various requirements of good disinfectant. Mention methods of disinfection and factors affecting the efficiency of disinfection. **[8]**

b) Why fluoridation and de-fluoridation is essential? Discuss different methods. **[8]**

Q9) a) Mention requirements of good distribution system. Also discuss pressure in distribution mains. **[8]**

b) A town with population of one million has a continuous water supply. Water is supplied at the rate of 250l pcd. Breakup of the water demand is as follows : **[10]**

Time	Liter/per Capita/day
4:30 am to 11:30 am	92
11:30 am to 4:30 pm	51
4:30 pm to 9:30 pm	76
9:30 pm to 12:30 am	21
12.30 a m to 4.30am	10

Water is supplied from the treatment plant at uniform rate for all 24 hours. Find the balancing capacity of the reservoir by mass curve method.

OR

Q10) Discuss the following : **[18]**

a) Wastage of Water- Detection and Prevention.

b) Methods of Rain water harvesting.

c) Intermittent system and its drawbacks.