Total No. of Questions : 12]

SEAT No. :

P1674

[Total No. of Pages : 3

[4859]-1
B.E. (CIVIL)
ENVIRONMENTAL ENGINEERING-II
(2008 Course) (Semester - II)

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

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q3 or Q4,Q.5 or Q.6 from section I and Q.7 or Q.8,Q.9 or Q.10,Q11 or Q.12 from section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Discuss in details separate and combined systems of sewarages with their rnerits and limitations. **[6]**

b) The BOD of sewage incubated for one day at 30°C has been found to be 200m/lit. What will be 5 day BOD at 20°C? Assume K=0.12 (base10) at 20°C. **[6]**

c) Differentiate between sanitary sewage and Industrial wastewater. **[4]**

OR

Q2) a) Design a sanitary sewer for the following data: **[6]**

i) Population=100000persons.

ii) Rate of water supply=140 lit/capita/day.

iii) N=0.013

iv) Peak factor = 2.5

v) Slope = 1 in 850

b) Explain procedure of C.O.D. test. **[6]**

c) Expalin with neat sketch 'Drop manhole'. **[4]**

P.T.O.

Q3) a) Discuss the different modifications in Activated sludge process. **[6]**

b) Design an activated sludge process for following data: **[12]**

i)	Municipal wastewater flow rate	=	15,000 m^3/day
ii)	BOD of settled effluent	=	200mg/lit.
iii)	BOD of treated effluent	=	5 mg/lit.
iv)	Yield coefficient, Y	=	0.5 kg/kg.
v)	Endogenous decay coefficient,kd	=	0.05 d^{-1}
vi)	MLSS, X	=	3000mg/lit.
vii)	Return sludge solids concentration, X_r	=	15,000mg/lit.
viii)	Mean cell residence time, θ_c	=	10 days

Determine:

1) Volume of reactor.
2) F/M ratio.
3) Volumetric loading rate.
4) Oxygen requirement.
5) Recycle ratio.
6) BOD removal efficiency.

OR

Q4) a) Design a high rate trickling filter using N.R.C. equation for following data: **[12]**

i)	Sewage flow	=	15 Mld.
ii)	Recirculation ratio	=	1.5
iii)	BOD	=	200mg/lit.
iv)	BOD removal in primary clarifier	=	35%
v)	Final effluent BOD desired	=	20mg/1.

b) Explain the two stage Trickling filter with neat flow diagram. **[6]**

Q5) a) With the help of neat sketch explain Oxygen Sag Curve.. **[6]**

b) What are the natural forces acts for the purification of streams? **[6]**

c) Explain different treatment units in preliminary treatment of waste water. **[4]**

OR

Q6) a) Design a grit chamber for the following data: **[6]**

i) Maximum flow: 30 MLD
ii) Diameter of particle to be removed: 0.2 mm and more.
iii) Specific gravity of particle: 2.65.
iv) Average temperature: 20°C.

b) Design bar screen for a peak flow of 60 million liters per day. **[6]**

c) Write a short note on proportional flow weir. **[4]**

SECTION - II

Q7) a) Discuss different chemical treatment options for Industrial wastewater. **[6]**

b) Write in details design parameters of aerated lagoons and mention the advantages and disadvantages of the same. **[6]**

c) Define: **[4]**

i) MLSS and

ii) MLVSS

OR

Q8) a) Explain the algal Bacterial symbiosis. **[6]**

b) Write short note on Oxygen sag curve. **[4]**

c) Write about constructional details and design criteria of oxidation ditch. **[6]**

Q9) Design a septic tank to treat sewage from a working women hostel of 2500 residents. Water supply rate 130 lpcd **[16]**

Draw a neat sketch giving plan elevation of a septic tank designed above. Also design and draw a soak well for the above septic tank considering percolation capacity of the filter media say 1250 L/m^3 day. Assume all other required data.

OR

Q10) Explain with the help of neat sketch of conventional sludge digester and explain the following:-

Different stages of the digestion process.

Design parameters of anaerobic digester.

Capacity of the digester. **[16]**

Q11) With the help of manufacturing flow diagram, explain the sources of wastewater generation from sugar industry. Also discuss its characteristics and treatment options with the help of neat sketch. **[18]**

OR

Q12) With the help of manufacturing flow diagram, explain the sources of wastewater generation from Textiles industry. Also discuss its characteristics and treatment opthaions with the help of neat sketch. **[18]**