



COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

Waste Water Engineering (Th) CE-14001

Course: B.Tech

Branch: Civil Engineering

Semester: Sem VII

Year: 2014-2015

Max.Marks:60

Duration: 3 Hours Time:- 10.00-2.00 PM

Date

24 NOV 2014

Instructions:

MIS No.

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1. Attempt any five questions & Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

- Q.1 A. Enlist the basic design consideration in waste water treatment. Explain any two in detail. (6)
- B. Explain Aerobic and anaerobic decomposition of organic waste. (6)
- Q.2 A. Discuss the various standards applicable to waste water treatment in brief. what is the logic behind this standards (6)
- B. Explain the environmental significance of following parameters.
a) BOD b) COD c) pH d) Electrical Conductivity e) Turbidity f) Solid content (6)
- Q.3 A. Explain the purpose of grit chamber. What is the logic that governs design? Determine the dimension and detention time for a grit chamber for a maximum waste water flow of $8000\text{m}^3/\text{day}$ to remove the particles having average settling velocity of 0.2 m/sec for a constant flow through velocity of 0.3m/sec maintained by provision of proportional flow weir. (6)
- B. Draw and explain the oxygen sag curve. Explain various zones of pollution in a river. (6)

(1/2)

Q.4

A.

An average operating data from a conventional activated sludge process is as follows.

Waste water Flow = 29000 m³/day

Volume of aeration tank = 8500 m³

Influent BOD = 173 mg/L

Effluent BOD = 20 mg/L

MLSS = X = 2500 mg/L

Effluent suspended solids = 22mg/L

Waste sludge suspended solids = 9800mg/L

Calculate F/M ratio, HRT, MCRT, Recirculation Ratio efficiency for the ASP.

Compare the results with the standard characteristics of ASP. (6)

B. Explain operational problems of activated sludge process and their remedies. (6)

Q.5

A. Design an oxidation pond based on the following data.

a) Population to be served = 10,000

b) Sewage flow = 150 lpcd

c) Elevation = 700 m above sea level

d) Location = 24°N

e) Influent BOD = 300mg/L.

f) Effluent BOD = 30mg/L.

g) Per capita BOD contribution = 0.045kg/day

h) BOD removal at 10 °C = 0.1/day

i) Mean monthly temperature = 10° C (Min) and 25° C (Max.)

j) BOD loading at 24°N = 230kg/ha/day (6)

B. Write a short notes on

a) SVI and F / M ratio

b) Extended Aeration Process (6)

Q.6

A. A town discharges 14 million liters of sewage per day at a temperature of 23° C in to a river having flow of 1.73m³/sec and the temperature of stream is 20°C. BOD of the waste water at 20°C is 160 mg/L. and K (base 10) is 0.1 /day. If R= 0.2/day. What is the critical oxygen deficit and at what distance it will occur. Assume the suitable data wherever necessary.

(6)

B. Explain with sketch the principle of working of Trickling Filter.

(6)

Q.7

A. Draw a sketch and explain the principle of up flow sludge blanket reactors. (6)

B. Enlist the various stages of sludge treatment and explain them in detail. (6)

(2/2)