

Total No. of Questions : 10]

SEAT No. :

P3059

[5059]-501

[Total No. of Pages :3

B.E (Civil)

ENVIRONMENTAL ENGINEERING - II

(2012 Course) (Semester-I) (401001)

Time : 2½ Hours]

[Max. Marks : 70

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, and Q.9 or Q.10.*
- 2) *Figures to the right indicates full marks.*
- 3) *Draw Neat figures wherever necessary.*
- 4) *Assume suitable data if necessary.*
- 5) *Use of scientific calculators is allowed.*

- Q1)** a) Define treatability index. Write wastewater treatment option with respect to treatability index. **[4]**
- b) Write the procedure to determine total volatile solids and its significance in wastewater treatment. **[6]**

OR

- Q2)** a) Explain pumping of sewage with respect to need, location and types of pumps. **[5]**
- b) Design a mechanically cleaned radial flow circular settling tank for treating sewage from a population of 25000 persons. **[5]**

Given:

Maximum hourly flow = (1/14) of the daily flow

Volume of sludge = 1.19 l/c/d

Water consumption = 135 l/c/d

- Q3)** a) Write the difference between preliminary treatment and primary treatment. **[5]**
- b) Write a short note on the self-purification of streams. **[5]**

OR

P.T.O.

Q4) a) Calculate the effluent BOD of a two stage trickling filter with the following data [6]

- i) Flow = 2.30 m³/min
- ii) BOD₅ = 300 mg/l
- iii) Volume of filter 1 = 900 m³
- iv) Volume of filter 2 = 900 m³
- v) Filter depth = 2 m
- vi) Recirculation ratio for both the filter = 1.5

Use NRC formula.

b) With the help of a neat sketch, explain the activated sludge process. [4]

Q5) a) What do you understand by oxidation pond? Where it is used? What is its principle? [8]

b) Explain aerated lagoon with respect to its working principle, design parameters and applications. [8]

OR

Q6) a) Write short note on phytoremediation for wastewater treatment. [8]

b) Design an oxidation pond for a colony of 3000 population. The sewage flow is 100 l/p/d. BOD₅ is 300 mg/l. Assume necessary required data. [8]

Q7) a) Design a sludge digestion tank with the following data [8]

- i) Average flow of sewage = 60 MLD
- ii) Total suspended solids in raw sewage = 350 mg/l
- iii) Volatile suspended solids = 250 mg/l
- iv) Moisture content in the digested sludge = 87 %
- v) Removal from PST = 65 %
- vi) Moisture content in fresh sludge = 95 %

- b) Draw a flowchart of package sewage treatment plant and explain its working principle. Write its advantages and disadvantages. [8]

OR

- Q8)** a) Design a gravity thickeners for thickening the combined primary and activated sludge from a treatment plant for 150000 population. [8]
- b) Write working principle of UASB. Enlist design parameters of UASB and its limitations. [8]
- Q9)** a) Enlist different units used in preliminary, primary and secondary treatment in industrial wastewater treatment. Write its significance for which impurities to be removed. [9]
- b) Explain equalization and neutralization unit process with respect to its working principle, need, factors affecting the process and application. [9]

OR

- Q10)**a) Draw a neat sketch showing the points where spent wash is generated in the distillery. [6]
- b) Discuss the characteristics of dairy industry. [4]
- c) Draw a flow chart showing various treatment units used to treat sugar industry wastewater. Explain the important units. [8]

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