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 1/c/d

   Water consumption   = 135 1/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

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

  i)   Flow   = 2.30 m³/min

  ii) BOD_5 = 300 mg/1

  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 1001/p/d. BOD_5 is 300 mg/1. 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/1

  iii) Volatile suspended solids   = 250 mg/1

  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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