Total No. of Questions : 10]

SEAT No. :

P5107

[Total No. of Pages : 3

[5561]-501

B.E. (Civil)

ENVIRONMENTAL ENGINEERING - II

(2015 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or 2, Q.3 or 4, Q.5 or 6, Q.7 or 8, Q.9 or 10***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Write Streeter-Phelps equation and explain the meaning each term involved in it. **[5]**

b) Find min velocity and gradient required to carry coarse sand particles of sizel.5 mm and specific gravity is 2.65 through a sewer of diameter 0.9 m. Assume constants beta = 0.04, f = 0.03 and N = 0.013. The sewer may be assumed to run half full. **[5]**

OR

Q2) a) Write a short note on pumping of sewage. **[5]**

b) Explain in brief Self-purification of natural stream. **[5]**

Q3) a) Design a grit chamber with proportioning flow weir using the following data: **[6]**

i) Sewage flow = 10MLD
ii) Grit size = 0.2mm. sp.gr. = 2.65
iii) Temperature of sewage = 10
iv) Desired removal efficiency = 80%
v) Constant n = 1/4

Determine:

I. Required surface overflow rate.
II. Number and dimensions of grit channels.
III. Dimensions of proportioning flow weir

P.T.O.

b) Draw the flow diagram for primary settlement of sewage. State the type of impurities removed in each unit. **[4]**

OR

Q4) a) Write working principle of rotating biological contactor. Also write the advantages and disadvantages. **[5]**

b) State modifications in ASP and hence differentiate between completely mixed ASP and extended processes. **[5]**

Q5) a) Write a note on phytoremediation for waste water treatment. **[8]**

b) Design an oxidation pond for treating sewage from a residential colony having population of 10,000 with sewage flow rate of 120 lpcd with the following data. **[8]**

BOD_5 of raw sewage = 300 mg/1

Desired effluent BODs = 30 mg/1

Location - 28° N

Elevation - 200 m above sea level

Temperature - 25°C

Sky clearance factor - 60%

BOD removal rate constant for the pond at 20° C as 0. l/d

Assume permissible organic loading at 28°N as 200 kg/ha.d

OR

Q6) a) Explain aerated lagoon with respect to its working principle, design parameters and applications. **[8]**

b) Explain the Algal-Bacterial symbiosis in oxidation ponds. Discuss the design criteria of Oxidation Pond. **[8]**

Q7) a) Write a detailed note on Sludge digester. **[8]**

b) Explain in brief working principle, advantages and disadvantages of Packaged sewage treatment plant. **[8]**

OR

Q8) a) Discuss different methods of sludge treatment and disposal. **[8]**

b) Write principle and stages of anaerobic digestion. Explain factors affecting digestion process. **[8]**

Q9) a) Explain the following points related to Distillery industry. **[9]**

i) Flow sheet of manufacturing process and wastewater generation

ii) Characteristics of waste water.

iii) Flow sheet of wastewater treatment.

b) Explain methods of waste water sampling. **[5]**

c) Write characteristics of Sugar industry wastewater. **[4]**

OR

Q10)a) Explain the following points related to dairy industry. **[9]**

i) Flow sheet of manufacturing process and wastewater generation

ii) Characteristics of waste water.

iii) Flow sheet of wastewater treatment

b) Explain equalization and neutralization unit process with respect to its working principle, need, factors affecting the process and application.**[9]**

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