[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

15341

B. Tech 8th Semester Examination

Advance Environmental Engineering (OS)

CE-8010

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

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Must attempt one question, from each of the section i.e.: Section A-E, Section E is compulsory.

(ii) All parts of a question should be answered at one place.

(iii) Answer should be brief and to - the - point and supplemented with neat sketches. Unnecessary long answer may result in loss of marks.

(iv) Any missing or wrong data may be assumed suitably giving proper justification.

(v) Figures on the right hand side margin indicate full marks.

SECTION - A

1. (a) What environmental factors you will be considered during nitrification? (10)

   (b) Explain using diagram how SST designed for limiting solids flux ensures higher concentration of solids in the underflow than assumed irrespective of the solids concentration in the influent. (10)

2. (a) Suggest few methods for removal of toxic compounds and refractory organic for industrial wastewater. (10)

[P.T.O.]

   (b) Draw the schematic layout of 100 MLD wastewater treatment plant showing typical sequence of unit operations like screen chamber, grit chamber, primary sedimentation tank, aeration tank, secondary sedimentation tank, sludge thickener, sludge digester, gas holder, sludge drying bed, pump house etc. (10)

SECTION - B

3. (a) Briefly describe the salient features for air pollution monitoring. (10)

   (b) What precaution you will take during monitoring of ambient air quality for site selection? (10)

4. (a) Write down step wise scheduling and procedure for identifying river water quality index. (10)

   (b) What is sampling? Also write their classification. What sampling method you will follow for river water sampling? (10)

SECTION - C

5. (a) What are different classifications of contaminant transport model? (10)

   (b) Why spend time in developing taxonomy of environmental models - does it serve any purpose or except for academic curiosity? Explain your views. (10)

6. (a) Describe with neat sketch Gaussian Plume Model and derive it's expression. (10)

   (b) How you will be step out for eutrophication and nutrient models? Describe with neat diagram and write their expression. (10)

SECTION - D

7. (a) Briefly describe the merits and demerits of various types of biological conversion processes of solid waste with design considerations. (10)

(b) Determine the amount of oxygen required for oxidizing 500 Kg of an organic solid waste aerobically. Assume that the initial composition of the organic material is $[C_6H_8O_3(OH)_2]_5$ and the final composition of estimated organic matter found to be $[C_6H_8O_3(OH)_2]_2$ and 200 Kg of organic matter remains after the oxidation.

[Reaction: $CaHbOcNd + 0.5(ny+2s+r-c)O_2 \rightarrow nCwHxOyNz + sCO_2 + rH_2O + (d - nx)NH_3$;

Mol wt. of C=12, H=1, N=14, O=32; r=0.5{b-nx-3(d-nx)}; s=a-nw] (10)

8. (a) Explain the important factors that must be considered in the design and operation of solid waste landfill. (10)

(b) Data given below for landfill site near to the Baddi, Himachal Pradesh. Current waste generation = 1000 tons/d, total waste generation $=7*10^6$ tons, density of waste is 0.85 t/cm.m

(i) To find out total volume of waste (Vw).

(ii) Total volume of daily cover (Vdc). (10)

SECTION - E

9. Write short notes on any five:

(i) Why need to control nutrient from wastewater?

(ii) What do you mean by natural treatment system?

(iii) How engineered system differ from natural system?

(iv) Write parameters which you will consider for knowing air quality.

(v) What do you mean by modeling and simulation?

(vi) Write down physical composition of solid waste and briefly describe any one.

(vii) Limitation of Gaussian models. (5×4=20)