Paper Code: CH-071

Roll No. | | | | | | | | | | |

B.TECH
SEVENTH SEMESTER EXAMINATION, 2016-17
INSUTRIAL POLLUTION ABATEMENT AND WASTE MANAGEMENT

[Time: 3 Hours] [Max. Marks: 100]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

1. Attempt any four parts of the following:- **[5x4=20]**

(a) What do you mean by environment? Tabulate the major concerned issues related to industrial pollution abatement for a chemical industry.
(b) Differentiate between physical, chemical and biological methods for the treatment of wastewater.
(c) The BOD_6 of a wastewater is determined to be 400 mg/L at 20_oC. The k value at 20_oC is known to be 0.23 per day. What would be BOD_8 value if tests were run at 15_oC?
(d) List the various pollutants discharges from pulp & Paper industry and their effects.
(e) Name the six characteristics of the waste because of which any waste can be classified as hazardous waste.
(f) What are the problems arises in collection and handling of solid wastes?

2. Attempt any four parts of the following:- **[5x4=20]**

(a) A 2m deep trickling filter has a diameter of 18m is operated with a recirculation ratio of 1.5. A raw wastewater flow is 2.5millionL/day and the BOD_5 of the raw sewage is 210 mg/l. Assuming that the primary tank BOD removal efficiency is 30%. Compute the hydraulic and organic load on the trickling filter.
(b) List the various standards for ambient air, noise and water pollution.
(c) Write short note on the characterization of emissions and effluents.
(d) Write the material and energy balance equation for pollution minimization.
(e) Write various design equation used for the design of trickling filter.
(f) Explain the waste management in sugar industry.

3. Attempt any two parts of the following:- **[10x2=20]**

(a) Discuss about the following process:
  (i) Settling Tanks
  (ii) Ion-Exchange
  (iii)Hydro cyclones
(b) Explain at least five different environmental laws.

(c) A large stream has a rate of re-aeration k_r=0.4 per day & Θ=1.016 and a rate of de-oxygenation k_d=0.23 per day & Θ=1.047. The DO deficit of the mixture of stream water and wastewater at the point of reference D_0 is 8.7 mg/l.The velocity of stream is 0.2 m/s. Calculate the critical deficit and the critical time. Following data are given at 20^0C.

	Flow Q(mg/l)	Temp(.C)	DO(mg/l)	BOD_5(mg/l)
Stream Water	15000	25	2	40
Sewage	43200	22	8	3

4. Attempt any two parts of the following:- **[10x2=20]**

(a) What is composting? Discuss various processes and phases of composting. Write about various factors which affect composting.

(b) Discuss the role of environmental impact assessment on sustainable fertilizer industry.

(c) Write short note on the following
  (i) Alternative raw material
  (ii) Water use minimization
  (iii) Process modification

5. Attempt any two parts of the following:- **[10x2=20]**

(a) Discuss various issues related to land filling. Explain waste decomposition process in a landfill.

(b) Discuss pollution abatement process in the following industries
  (i) Electroplating
  (ii) Cement

(c) A rotary kiln is designed for a nominal heat release of 15000 btu/hrft^3 has an inside diameter of 8ft and is 30ft long. Determine the design heat release in btu/hr. Normally a waste having a heating value of 750btu/pound is burned in the kiln. It is fed continuously. Occasionally a waste consisting of polyethylene pellets is batch fed to the kiln in 30 gallon fibre containers. The pellets have a bulk density of 50 pound/ft3 and a heating value of 18350 btu/pound. A single container is consumed in 6.5 minutes. Will the kiln operate within its design parameters?