

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
END-SEMESTER EXAMINATION (May- 2015)
M. Tech. (II- SEM.)

COURSE CODE: 14M31CE213

MAX. MARKS: 45

COURSE NAME: Industrial Wastewater Treatment

COURSE CREDIT: 3

MAX. TIME: 3 HRS

Note: Attempt all Questions. Assume suitable data if required.

Section A – (6 x 1.5 = 10 Marks)

1. Answer the following
 - a) Mention the main raw materials and important products obtained from chloro-alkali industries.
 - b) Write down the general reaction for ultimate conversion of an organic compound upto mineralization
 - c) Why is anaerobic treatment preferred for treatment of industrial wastes than aerobic methods?
 - d) Discuss the importance of hydraulic loading rate. With a neat sketch show the variation of hydraulic loading rates with pH at different depths.
 - e) Discuss some of the instruments used for flow measurement in industrial wastes with neat sketches and mathematical expressions
 - f) With a neat sketch explain the working of an anaerobic digester

Section B – (4.5 x 3 = 13.5 Marks)

2. Estimate the total flow (m^3/day), BOD (kg/day) and total nitrogen (kg/day) received at a wastewater treatment plant using the following information (a) A population of 180000 with a water supply of 120lpcd with a BOD_5 generation of 54gpcd and Total N of 8gpcd (b) meat packing plant of 5000kg live weight/day. The flow required is 29 $m^3/1000$ kg of live packing and BOD_5 generation of 50kg/1000 kg of live packing and Total N of 6kg/1000 kg of live packing (c) Brewery producing 80,000 l/day of liquor with a flow requirement of 10litres per liter of beer, and BOD_5 generation of 8g/per liter of liquor and Total N of 0.3g per liter of liquor and (d) Cotton mill producing 50,000 kg/day with a flow requirement of 500 l/kg of cotton produced and BOD_5 generation of 150kg/1000 kg of cotton produced and Total N of 10kg/1000 kg of cotton produced (4.5)
3. a) Describe the major undesirable characteristics of industrial wastes and their effects on receiving stream (2)
3. b) In the mercury cell process, identify the sources of mercury pollution through gaseous liquid and solid waste routes (2.5)
4. Determine the volume of equalization tank from the data given below. (4.5)

Time period	Volume of wastewater (m^3)
8-11	22.5
11-14	43.8
14-17	17.9
17-20	35.5
20-23	30.8
23-2	12.8
2-5	19.6
5-8	7.5

Section C – (7.5 x 3 = 22.5 Marks)

5. The treatment regime of tannery effluent system is a combination of physical, chemical and biological process system. Discuss the above statement explaining the following treatment steps (a) Effluent separation in tannery (b) Hair removal in limiting bath (c) Chromium recovery in tanning bath (d) Screening operation (e) Equalization And sulfide oxidation (f) flocculation (g) sedimentation (h) sludge treatment and biological methods and (i) innovative methods (7.5)
6. With a neat flow sketches for each, explain the three main chloro-alkali processes namely (a) cell membrane process (b) diaphragm process and (c) mercury process and compare them briefly (7.5)
7. Discuss the application of various anaerobic reactors for treatment of high strength wastewater emanating from different many industries. ~~7.5~~

JUIT WAKNAGHAT, (END-SEMESTER EXAM, May 2011)