Dr Rajni Gupta

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T2- EXAMINATION (October - 2017)
M. Tech. (I- SEM.)

COURSE CODE: 14M31CE113 MAX. MARKS: 25
COURSE NAME: Water Supply and Treatment
COURSE CREDIT: 3 MAX. TIME: 1.5 HRS

Note: Attempt all questions. Assume suitable data if required. Carrying of mobile phone during examinations will be treated as case of unfair means

1. A solution consists of 0.025M Ba^{+2} and 0.025M Ca^{+2} to which SO_4^{-2} is added in small doses. Determine (a) at what SO_4^{-2} will $BaSO_4$ precipitate (b) at what SO_4^{-2} will $CaSO_4$ precipitate (c) what is the barium concentration when $CaSO_4$ will precipitate (d) over what pH range can barium be separated from calcium **(6)**

2. Explain the assumptions used for design of fixed bed reactor. In this context, derive an expression to find percent column saturation in a fixed bed reactor. **(2+2)**

3. Determine the Salinity Correction Factor and Saturation Index for a water sample having a pH of 7.75 and having calcium hardness as 300 mg/l and total hardness of 500 mg/l expressed as $CaCO_3$. The total alkalinity of water is 400 mg/l expressed as $CaCO_3$. The temperature of water is 10^0C and assumes pK_s and pK_2 values of 8.30 and 10.50 respectively. **(3)**

4. Define the terms (a) phenol value (b) Iodine number (c) Molasses number **(1+1+1)**

5. An initial experiment was carried out to remove COD with an initial value of 100 mg/l with desired effluent concentration being 20 mg/l. Six beakers of 250 ml of sample each were utilized for adding of different doses of carbon as shown in the following table. Using the information determine (a) the functional relationship of the isotherm (b) with a neat sketch derive a condition for treatment in countercurrent system (c) the dosage of carbon required to treat in counter current system. Assume $(x/m)_0$ = 0.05mgCOD/mg carbon **(3+3+3)**

Beaker No	1	2	3	4	5	6
COD concentration (mg/l)	78.6	74.2	71.5	69.3	67.6	62
Carbon dose (mg)	35	47.5	60	72.5	85	160