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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
MAKEUP EXAMINATION (APRIL - 2017)
M. Tech. (II- SEM.)/ B. Tech. (VIII- SEM.)

COURSE CODE: 14M31CE213 MAX. MARKS: 25
COURSE NAME: Industrial Wastewater Treatment
COURSE CREDIT: 3 MAX. TIME: 1.5 HRS

Note: Attempt all Questions. Carrying of mobile phones during exams will be treated as case of unfair means. Assume suitable data if required.

1. In context of equalization basins, explain why flow equalization is important. Discuss the different disadvantages associated with the operation of equalization basin. **(3+3)**

2. In the context of floatation technique used for removal of oil and grease, discuss with neat sketches (a) floatation system without recirculation and (b) floatation system with recirculation. **(3+3)**

3. Define the term free reactive oxygen (O^*). Mention the chemical reaction for ultimate conversion of organic compound till mineralization using free reactive oxygen explaining all the terms. Using the above equation write balanced equation for phenol (C_6H_5OH) using H_2O_2 and MnO_4^-. **(1+1+1+1)**

4. A wastewater has flow of 1000 m^3/d at a temperature of 25^0C and is primarily of oily nature. The influent concentration of suspended solids is 1200 mg/l with a removal efficiency of 90%. The alum dose applied is 100mg/l with a recycle pressure of $4kg/cm^2$. The sludge produced has 3% weight by solids and sludge produced is 0.65mg/mg of alum. Design a DAF system including (a) Recycle rate (b) Surface area of Floatation and (c) sludge quantity generated. Assume f = 0.60, weight of solubility of air at 25^0C is 15.7 mg/l, A/S = 0.04 and SLR of 10 $l/m^2/min$ **(3)**

6. Precipitation technique using hydroxide is to be used for removal of Zinc in a plating industry. Determine the control pH if the effluent zinc concentration is set at 0.45mg/l. $K_{sp} = 7.5 \times 10^{-17}$ **(3)**

7. In a neat tabular form, explain the different heavy metals, the forms in which they occur and the major industries producing them. **(3)**