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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST III EXAMINATION (May - 2017)

M. Tech. (II- SEM.)/B.Tech. (VIII- SEM)

COURSE CODE: 14M31CE213

MAX. MARKS: 35

COURSE NAME: Industrial Wastewater Treatment

COURSE CREDIT: 3

MAX. TIME: 2 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. With a neat flow sketch, if appropriate, discuss the different manufacturing steps involved in manufacturing of urea'. Explain the different sources of wastewater generated during this process and discuss the different treatment alternatives for the same. (4+4)
2. With a neat flow sketch, if appropriate, explain the various steps involved in cheese production in dairy industry. Explain the term pasteurization in this context. With neat flow sketches show the treatment alternatives for (a) best practices (b) dairy waste to be used for irrigation after primary treatment (c) Low cost treatment system and (d) ASP system (3+2+3)
3. Discuss the important considerations for design of a high rate digester system. (3)
4. With a neat flowsheet, explain the different processes involved in anaerobic digestion. (4)
5. Design a low rate digester system for a population of 80,000 with a fresh sludge generation of 0.18kg dry solids per capita. The volatile solids are 65% of dry solids. Dry solids are 4.5% of sludge production and the wet specific gravity is 1.02. About 65% of volatile solids are destroyed in the digestion process and there is no change in fixed solids concentration during digestion. The digested sludge has 7.5% dry solids with a wet specific gravity of 1.05. The operating temperature is 32°C and the digestion time associated with this temperature is 27 days. The sludge storage time is 55 days. Assume that sludge occupies lower half of tank depth and supernatant and gas occupy upper half (5)
6. With chemical reactions, explain the use of hydrogen peroxide as a chemical oxidant. Discuss its merits and demerits for the same. (4)
7. Design the heat requirements for a low rate digester system for a population of 50,000 with an overall fresh sludge generation of 0.20 kg dry solids per capita. The fresh sludge has 5% dry solids and the operating temperature is 38°C and the sludge temperature during coldest month is 10°C. (3)