

AGRICULTURAL & FOOD ENGINEERING DEPARTMENT
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR 721 302

Date of Examination: 28/04/04(FN) End Semester, 2004 Full marks: 50
M.Tech in Applied Botany Subject: Environmental Microbiology & Biopollution Control
Subject no. AG60130 No.of students: 6 Time: 3h

Special Instructions: Attempt all questions. Marks allotted are in parentheses

- 1(a) Briefly discuss five important factors that may influence biological treatment efficiency of solid/liquid wastes under aerobic/anaerobic condition. (5)
- (b) Why there is a need for advanced wastewater treatment? Give a comparative account on the extensive vs intensive systems with reference to microalgal wastewater treatment process. (2 + 3)
- 2(a) To run a community biogas plant the following raw materials were collected having the given composition. Among those raw materials the quantity of raw garbage and rice straw have been quantified to 900 Kgs and 100 Kgs respectively. What will be the C/N ratio of the final feed materials so that the final ratio will come to 30? Calculate the amount of the other two raw materials required.

Materials	TS (%)	N (%) (dry basis)	C/N (dry basis)
Cattle dung	20	1.7	20
Night soil	10	6.0	10
Rice straw	80	1.3	80
Raw garbage	25	2.2	25

(5)

- (b) Discuss the phenomenon of break-point chlorination. (5)

- 3(a) What is photochemical smog ? Diagrammatically represent the tropospheric ozone-machine and discuss. (1+2+2)

- (b) Laboratory tests were conducted on waste containing 50mg/L phenol. Four jars containing 1 L of waste were dosed with granular activated carbon. When equilibrium was reached, the contents of each jar were analyzed for phenol. The results are shown in the following table:

Jar No.	Carbon added (g)	Equilibrium conc. of phenol (mg/L)
1	0.5	6.0
2	0.64	1.0
3	1.0	0.25
4	2.0	0.08

Plot the adsorption isotherm using the above data and discuss. (5)

- 4(a) Prove that the amount of biogas generation is the quantitative measurement of some kinds of pollutants removal from wastes. (5)

- (b) How to distinguish between Composting and Biomanure? Discuss elaborately why the application of chemical fertilizer should be replaced with the organic fertilizer giving special emphasis to its advantages over chemical fertilizer. (5)

5. Briefly describe

- (a) Ozonation
- (b) Granular media filtration
- (c) Products of combustion
- (d) Ion Exchange
- (e) Dry deposition

(2 X 5)