Reg. No.



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

IISEMESTER M.TECH (INDUSTRIAL BIOTECHNOLOGY) END SEMESTER EXAMINATIONS, APRIL 2018 (REGULAR)

BIO5247- DESIGN AND DEVELOPMENT OF BIOLOGICAL TREATMENT PROCESSES

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

1A.	 Write on the impact of solid Retention Time (SRT) on the following functions of activated sludge process during BOD removal Nitrification 									4
1B.	 Write on the bacteria metabolism in the following cases of wastewater treatment i. Aerobic heterotrophs ii. Aerobic autotrophs iii. Anaerobic heterotrophs 									3
1C.	Explain the working principle of high-purity oxygen activated sludge process. Write any one drawback of this process									3
2A.	With a flow diagram explain the Mass and energy balance for aerobic glucose respiration and sewage sludge stabilization									4
2B.	With a flow diagram describe the growth associated aerobic degradation of proteins.									3
2C.	Explain the various factors that are effecting the biosorption of metals									3
3A	From the following BOD test data determine the values of ultimate BOD and rate constants using method of least squares Time, days 0 1 2 4 6 8 10 BOD mg/l 0 1 2 4 6 8 10									3
3B.	Write on the major gap in modeling of aerobic wastewater treatment processes. What are the elements that are to be included while modeling of activated sludge process?									3
3C.	A completely mixed activated sludge system is to be used for organic matter removal only with the following growth data of the microorganisms: μ_m =3.5 d ⁻¹ , K _d =0.06 d ⁻¹ , Y=0.45, Ks=150 mg/L, Q=14000 m ³ /d, BOD=100 mg/L, Required effluent BOD= 15 mg/L, X=3000 mg/l, X _r =10000 mg/l									4

