

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- September 2016

B.Tech Vth Semester

COURSE CODE: 15B11BT511

MAX. MARKS: 15

COURSE NAME: Bioprocess Engineering

COURSE CREDITS: 04

MAX. TIME: 1Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Give all answers to the point.

1. What is the role of a bioprocess engineer in a biotech industry? [1]
2. What do you understand by Good Manufacturing Practices? [1]
3. Explain the concept of Hydrodynamic Boundary Layer (HBL) with suitable diagram. [2]
4. Why the mixing power is always lesser than the actual power consumed during agitation? [2]
5. How will you determine K_La of a fermenter using dynamic gassing out method? How it is better than a sulphite oxidation method? [3+1]
6. A cylindrical stirred bioreactor of diameter and height 2 m has a Rushton turbine one-third the tank diameter in size. The bioreactor contains Newtonian culture broth with the same density as water and with viscosity 4 cP. If the specific power consumption must not exceed 1.5 kWm^{-3} , determine the maximum allowable stirrer speed. What is the mixing time under these conditions? [2+1]
7. A strain of *Azotobacter vinelandii* is cultured in a 15 m^3 stirred fermenter for alginate production. Under current operating conditions k_{La} is 0.17 s^{-1} . Oxygen solubility in the broth is approximately $8 \times 10^{-3} \text{ kg m}^{-3}$. The specific rate of oxygen uptake is $12.5 \text{ mmol g}^{-1} \text{ h}^{-1}$. Determine the maximum possible cell concentration in g/l? [2]