

R09

Code No: D0301

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech II - Semester Examinations, March 2011

**BIOREACTOR ENGINEERING
(BIOTECHNOLOGY)**

Time: 3hours

Max. Marks: 60

**Answer any five questions
All questions carry equal marks**

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1. Write about the ideal plug flow tubular reactor. Add a note on the relationship among substrate conversion (δ) and reactor design parameters for enzyme catalyzed reactions in a PFTR. [12]
2. Write about various measuring devices for monitoring and control of the physical environment of the bioreactor. [12]
3. Discuss about any two different methods for determination of oxygen transfer coefficient (KLa) in detail. [12]
4. Derive the equations to give the power requirements for un gassed Newtonian fluids in laminar zone and turbulent zone and draw the graph between Reynolds Number and Power Number for a un gassed system? [12]
5. Design a bioreactor for the production of secondary metabolites using non – filamentous fungi. Add a note on the product recovery. [12]
6. a) Describe some characteristic features of a fermenter which are needed to be considered while designing a fermenter.
b) What are the advantages and disadvantages of using off-centre impellers over baffles for creating turbulence? Explain in detail. [6+6]
7. Describe F curve and C-curve in RTD studies of non –ideal flow bioreactor. [12]
8. Explain various configuration of bioreactors used in animal cell culture. [12]
