

R09

Code No: 54051

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, April - 2018

BIOPROCESS ENGINEERING

(Biotechnology)

Time: 3 hours

Max. Marks: 75

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

1. Discuss briefly about various down stream unit operations involved in bioprocesses. [15]
2. Describe about the Material balance equations for unsteady state. [15]
3. Write notes on the following:
 - a) Energy balance for non reactive process.
 - b) Procedure for energy balance without reactions. [7+8]
4. Discuss about slurry fermentation with suitable example. Mention its advantages and disadvantages. [15]
5. Discuss about the design and usage of any one commercial media for industrial fermentation. [15]
6. Explain the following:
 - a) Stoichiometry of Cell growth
 - b) Elemental balances. [8+7]
7. How to determine the thermodynamic efficiency of microbial growth? [15]
8. Explain briefly about the Leudeking-Piret model for any product formation. [15]

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