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(20517) Roll No. ....

**B.Sc. Bio-Tech.-III Year**

**NS-3478**

**B.Sc. Bio-Technology Examination, May 2017**

**Industrial Bio-Technology**

**(B-306)**

**(New)**

*Time : Three Hours ] [Maximum Marks : 75*

**Note :** Attempt any **five** questions.

1. Describe the followings:
  - (i) Selection of industrial microorganisms for Fermentation
  - (ii) Aeration of Fermentation culture media
  - (iii) Protein engineering
2. Describe in detail the different stages of downstream processing with the help of suitable Flow chart.

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3. Explain the followings :

- (i) Airlift bioreactor
- (ii) Fluidized-bed bioreactor
- (iii) Photo-Bioreactor

4. Describe the basic design of a bioreactor. Explain the heat-transfer and scale-up bioreactors and their advantages.

5. Describe the various physical, chemical and biological parameters of bioprocess Engineering in detail.

6. Explain the followings :

- (i) Product recovery
- (ii) Lactose Utilization
- (iii) Solid state fermentation

7. What do you understand by enzyme immobilization? Explain various methods of enzyme and cell immobilization and their applications in Industries.

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8. Explain the commercial production of Insulin and Vitamin B-12 and their application.
9. Explain commercial production of penicillin and streptomycin and their applications.
10. What is fermentation? Explain the various stages of microbial growth curve with the help of suitable diagram.