

**NC-114**

November-2022

B.Sc., Sem.-V

**302 : Biotechnology  
(Biochemical Engineering)****Time : 2:30 Hours]****[Max. Marks : 70**

- Instructions :** (1) Draw figures wherever necessary.  
(2) Write question number against each answer.

1. What is bioreactor ? Describe various components and function with neat labelled diagram. 14
- OR**
- (A) Write differences of batch, fed-batch and continuous culture. 7  
(B) Explain in brief about airlift and membrane fermenters. 7
2. Explain different control parameters of a bioreactor and its importance. 14
- OR**
- (A) Write the principle of Flow Microfluorometry, Multiple Internal Reflection Spectrometry and its use in fermentation. 7  
(B) Discuss cascaded feedback control. 7
3. Describe Mass Transfer Theory and add a note on coefficient of oxygen transfer. 14
- OR**
- (A) How does heat flow in fluids ? Explain. 7  
(B) Explain the importance of rheological properties in a fermentation process. 7
4. Describe physical, chemical and enzymatic methods of cell disruption. 14
- OR**
- (A) Describe liquid -liquid and solid phase extraction methods in detail. 7  
(B) Describe recovery of products by chromatography in fermentation. 7

5. Answer any **Seven** of the following :

- (1) Write two materials used to construct bioreactors.
- (2) Define scale-up process.
- (3) Write the use of stirred tank reactor.
- (4) What is containment ?
- (5) Define perfusion bioreactor.
- (6) Write two applications of biosensor in process control.
- (7) What is PID control ?
- (8) What are on/off controls ?
- (9) Write the role of CO<sub>2</sub> in fermentation.
- (10) Name two antifoaming agents.
- (11) Write the function of heat transfer equipment.
- (12) What is KLa ?