Printed Page:-03 **Subject Code**:- **ABT0601**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2023 - 2024)

Subject: Bioseparation Engineering

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Total nitrogen measurement can be used to measure _____ (CO1) 1

(a) pH drift

(b) total protein

(c) specific enzyme

(d) viscosity

1-b. The yeast two-hybrid system is used for studying _____ (CO1) 1

(a) protein-protein interactions

(b) pressure changes

(c) molecular size

(d) differentiation pattern

1-c. The purest form of iron is: (CO2) 1

(a) cast iron

(b) pig iron

(c) wrought iron

(d) steel

1-d. Extraction of zinc from zinc blende is achieved by (CO2) 1

(a) electrolytic reduction

(b) roasting followed by reduction with carbon

(c) roasting followed by reduction with another metal
(d) roasting followed by self-reduction

1-e. Which one of the following is an example of adsorption? (CO3) 1

(a) ammonia in contact with water
(b) anhydrous CaCl2 with water
(c) silica gel in contact with water vapours
(d) all of these

1-f. An emulsifier is a substance which (CO3) 1

(a) stabilizes the emulsion
(b) coagulates the emulsion
(c) retards the dispersion of liquid in liquid
(d) causes homogenesis of emulsion

1-g. What is permeate? (CO4) 1

(a) Fluid that has retained in semi-permeable membrane
(b) Fluid that has passed through semi-permeable membrane
(c) Fluid that has to be passing through semi-permeable membrane
(d) d) The residue after filtration

1-h. What is filtration medium resistance? (CO4) 1

(a) Resistance by cake
(b) Resistance by filter medium
(c) Resistance by solution
(d) Resistance by cake and filter medium

1-i. What is seeding in crystallization? (CO5) 1

(a) It is the initial step in crystallization
(b) It is the final step in crystallization
(c) It is the step where nucleus is added
(d) It is the sub category crystallization

1-j. The moisture inside the substance is known as _____ (CO5) 1

(a) Bound moisture
(b) Unbound moisture
(c) Equilibrium moisture
(d) Free moisture

2. Attempt all parts:-

2.a. What are the modern methods of separation? (CO1) 2

2.b. What are the important parameters of adsorption? (CO2) 2

2.c. Which is the oldest and simplest method of enzyme immobilization? (CO3) 2

2.d. Why silica gel is used in TLC? (CO4) 2

2.e.	How does pH affect crystallization? (CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	How are proteins got separated from other biomolecules? (CO1)	6
3-b.	Discuss in detail about the different characteristics of biomolecules? (CO1)	6
3-c.	What are the advantages and disadvantages of membrane filtration method? (CO2)	6
3-d.	Discuss in detail about the working principle of gel electrophoresis? (CO2)	6
3.e.	What are physical and chemical methods of cell disruption? (CO3)	6
3.f.	Define chromatography? What is the importance of chromatography in protein analysis? (CO4)	6
3.g.	What do you understand by crystallization? Illustrate the different steps of crystallization? (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Explain the working principle of Filtration? Also discuss about the different types of filtration processes used in downstream processing? (CO1)	10
4-b.	Explain in detail about the different problems and challenges occur during bioproduct purification? (CO1)	10

5. Answer any one of the following:-

5-a.	How can you separate proteins of same molecular weight from unknown sample by electrophoresis? Discuss in detail? (CO2)	10
5-b.	Explain in detail about the construction and working principle of a high pressure mechanical homogenizer? (CO2)	10

6. Answer any one of the following:-

6-a.	What are the essential factors that need to be considered while selecting a cell disruption method? What is the significance of cell disruption? (CO3)	10
6-b.	How intracellular bioproducts can be extracted? Explain it with suitable examples? (CO3)	10

7. Answer any one of the following:-

7-a.	Explain the working principle of HPLC with the help of suitable diagram? (CO4)	10
7-b.	Explain the working principle and methodology of GC-MS? (CO4)	10

8. Answer any one of the following:-

8-a.	What do you understand by product polishing? Describe the various methods of product polishing used in an industries? (CO5)	10
8-b.	Describe the process of drying with a suitable diagram. (CO5)	10