Printed Page:- 04 **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. A high content of triglycerides is found in (CO1) 1

(a) VLDL

(b) LDL

(c) HDL

(d) Chylomicrons

1-b. Purification of a protein can be measured as an increase in _____ (CO1) 1

(a) temperature

(b) pH value

(c) specific activity

(d) polarity

1-c. Heating ore with carbon in the absence of air is known as: (CO2) 1

(a) reduction

(b) carbon-reduction

(c) smelting

(d) Roasting

1-d. Cassiterite is an ore of which metal? (CO2) 1

(a) Mn

(b) Sb

(c) Sn

(d) Ni

1-e. If the dispersed phase is a liquid and the dispersion medium is solid, the colloid is known as (CO3) 1

(a) foam

(b) sol

(c) emulsion

(d) gel

1-f. The slurry is ____. (CO3) 1

(a) A suspension to be filtered

(b) A porous membrane used to retain the solids

(c) The solids which are present on the filter

(d) A clear liquid passing through the filter

1-g. What is the pore size in ultra-filtration? (CO4) 1

(a) Around 0.1 micron

(b) Around 0.01 micron

(c) Around 0.001 micron

(d) Around 0.0001 micron

1-h. Which of the following used for sedimentation of red blood cells? (CO4) 1

(a) Low speed centrifuge

(b) High speed centrifuge

(c) Ultra centrifuge

(d) Vacuum centrifuge

1-i. For lapping of cemented carbides, ____ is used. (CO5) 1

(a) Emery

(b) Diamond

(c) Silicon carbide

(d) Aluminium oxide

1-j. What is the purpose of recrystallization? (CO5) 1

(a) To purify chemicals

(b) To dissolve crystals

(c) Continuous process of crystallization

(d) To clean crystallizers

2. Attempt all parts:-

2.a.	What is the importance of biomolecule separation? (CO1)	2
2.b.	What the three main types of extraction methods? (CO2)	2
2.c.	What are magnetic microbeads? (CO3)	2
2.d.	What is the unit of RF value? (CO4)	2
2.e.	Is crystallization a type of distillation? Give reasons to support your answer? (CO5)	2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a.	What is the importance of knowing separation techniques in biological processes? (CO1)	6
3-b.	Explain in detail the working principle of centrifugation? What is the significance of centrifugation? (CO1)	6
3-c.	Define membrane proteins? Why is it difficult to isolate membrane proteins? (CO2)	6
3-d.	Why cannot DNA pass through cell membrane easily? Give reasons? (CO2)	6
3.e.	Discuss in detail about the different methods for immobilization of proteins? (CO3)	6
3.f.	How is affinity chromatography used in the separation of biomolecules? (CO4)	6
3.g.	Is crystallization a cooling process? Give reasons to support your answer? (CO5)	6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a.	Explain in detail about the different types of filters used in downstream processing? (CO1)	10
4-b.	Define flocculation? Discuss in detail about the working mechanism of flocculation? What is the significance of flocculation? (CO1)	10

5. Answer any <u>one</u> of the following:-

5-a.	Illustrate the process of CTAB method for DNA separation? (CO2)	10
5-b.	Describe the principle and mechanism of precipitation of proteins by selective	10

thermal denaturation method? (CO2)

6. Answer any <u>one</u> of the following:-

6-a. Discuss in detail about the different physical and chemical methods of cell disruption? (CO3) 10

6-b. Explain different chemical strategies for the purification of fermented products? (CO3) 10

7. Answer any <u>one</u> of the following:-

7-a. Explain how milk protein can be extracted and purified at a large scale? (CO4) 10

7-b. What is ion exchange chromatography? How it can be used in protein purification? Discuss with the help of suitable diagram? (CO4) 10

8. Answer any <u>one</u> of the following:-

8-a. Discuss in detail about the different methods of drying? What are the essential factors that govern the drying process? (CO5) 10

8-b. Describe the applications of crystallization in the context of product polishing and product packaging? (CO5) 10