

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024

Subject Code:3170411

Date:28-05-2024

Subject Name:Downstream Processes

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

	MARKS
Q.1 (a) What is role of downstream processing in a biochemical industry?	03
(b) Explain Darcy's Law for filtration process.	04
(c) Classify different cell disruption techniques. Explain any two techniques in detail with their advantages and disadvantages.	07
Q.2 (a) What is membrane fouling?	03
(b) Draw diagram of any one type of centrifuge.	04
(c) Explain liquid liquid extraction process used in bioprocess industry.	07
OR	
(c) Enlist different methods for protein precipitation. Explain principle and working of any one method in detail.	07
Q.3 (a) Explain principle of adsorption.	03
(b) Explain different adsorbents used as stationary phase in column chromatography.	04
(c) Explain principle and working of molecular sieve chromatography	07
OR	
Q.3 (a) What are solvent gradient makers?	03
(b) What is elution, stationary phase, mobile phase, peristaltic pump?	04
(c) Give a schematic diagram of chromatographic setup and explain all its components.	07
Q.4 (a) What are selection criteria for solvents in liquid liquid extraction process?	03
(b) How can compressibility of cake be reduced during filtration process?	04
(c) Explain principle and working of ion exchange chromatography.	07
OR	
Q.4 (a) Give broad classification of bioproducts in reference to its separations.	03
(b) Explain principle of affinity chromatography	04
(c) Two proteins of molecular weight 1.5×10^5 and 1×10^4 were eluted out of a gel filtration column at 250 ml and 300 ml respectively. Determine molecular weight of a protein which elutes out at 270 ml from the column under the same conditions. The relation follows as $V_e = a - b \log M$.	07
Q.5 (a) Compare crystallization and drying as product finishing process.	03
(b) Write a note on lyophilization.	04
(c) Explain principle and working of hydrophobic chromatography.	07

OR

- Q.5** (a) Why is formulation a necessary step in finishing operation? **03**
(b) What are flocculants? Give its properties. **04**
(c) Explain process of fixed bed adsorption. **07**
