

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKE UP EXAM (Apr-2018)

B.Tech 6th Semester

COURSE CODE: 16B11BT611

MAX. MARKS: 25

COURSE NAME: Downstream Processing

COURSE CREDITS: 4

MAX. TIME: 1:30 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Why organic solvents are not used to prefer for the precipitation of Proteins? [1]
2. What is filter aid? How it is improved the filtration process? [2]
3. To increase the centrifugal effect, it is of greater advantage to use a centrifuge of the same size at a higher speed rather than using a larger centrifuge at the same speed of rotation. Justify the statement. [2]
4. Which type of liquid-liquid extraction is efficient: Multistage counter current, Multistage co- current or Single stage? Justify your answer. [2]
5. a) Why the purification of extracellular products is more advantageous over the intracellular products? [2]
b) Why DNA removal is important while intracellular protein recovery/purification? [2]
6. Suppose you have a protein mixture which contains five different proteins with the following properties:

Protein	Molecular weight	pI	Affinity	Remarks
A	100 kDa	5.0	-	
B	400 kDa	5.0	Ni ²⁺	
C	200 kDa	7.0	-	
D	400 kDa	7.0	-	
E	100 kDa	5.0	-	Have higher hydrophobicity as compared to Protein A

How will you purify each protein in minimal steps? Design a suitable experiment with proper justification. [4]

7. Differentiate between: [6]
 - a) Ion-Exchange and Hydrophobic Interaction Chromatography
 - b) HPLC and FPLC
8. Aqueous two-phase extraction is used to recover α -amylase from solution. A polyethylene glycol-dextran mixture is added and the solution separates into two phases. The partition coefficient is 4.2. Calculate the maximum possible enzyme recovery when:
 - a) the volume ratio of upper to lower phases is 5.0; and [2]
 - b) the volume ratio of upper to lower phases is 0.5. [2]