MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

Ist SEMESTER M.TECH. (INDUSTRIAL BIOTECHNOLOGY)

END-SEMESTER EXAMINATIONS, FEBRUARY 2022

11/02/2022 – Part B

Time: 2.20 PM– 3.35 PM

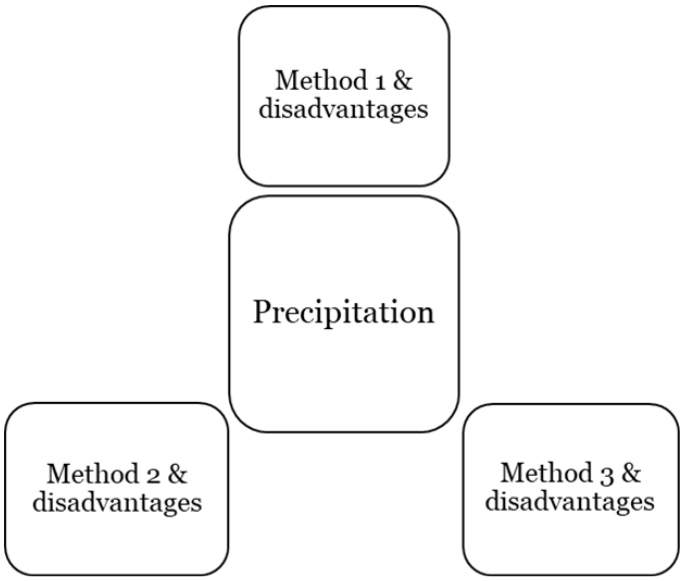
SUBJECT: ADVANCED BIOSEPARATIONS (BIO 5152)

MAX. MARKS: 20

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A	In a pharmaceutical company, I am trying to single out a protein that is largely composed of positively-charged amino acids. In the final stage of the RIPP scheme, if I have to choose a method, which technique would you recommend? Justify your choice. How would you proceed with this technique? Does pH of the solution affect the method that you have chosen, in any way? Explain.	**5m**
1B	Under what circumstances is size exclusion chromatography preferred? Explain the principle behind the method, with a simple schematic.	**3m**
1C	What factors do you think can be exploited to selectively change the properties of a matrix in a chromatography column, to our advantage?	**2m**
2A	Aditya interested in extracting Penicillin F from the clarified fermentation beer using pure amyl acetate as solvent (at pH 4.0). The distribution coefficient K of the system was found to be 32. The initial concentration of penicillin in the feed is 400 mg/L. The flow rates of the feed and the solvent streams are 500 L/hr and 30L/hr respectively. How many ideal stages (counter current) are required to recover 97% of penicillin in the feed? If you use 3 counter current stages, what will be the percent recovery?	**4m**
2B	One of the prerequisites in leveraging micelles for product recovery is to understand micelle formation and to determine micellar size. Discuss the two	**3m**

	techniques to explore the same? (Note: Conductivity measurements can be ignored)	
2C	Precipitation is widely employed to recover proteins from fermentation broth. List out the methods to precipitate protein (Principle with their disadvantages).  	**3m**