Reg. No. | | | | | | | | | |

M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017

SECOND SEMESTER

BIOTECHNOLOGY

BY16201 – BIOSEPARATION TECHNOLOGY

(Regulation 2016)

Q. Code: 748252

Time: Three Hours **Maximum : 100 Marks**

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Define Concentration polarization.
2. Enlist the importance of Down Stream Processing.
3. How will you analyse the pellet morphology of fungus?
4. Differentiate between centrifuge and centrifugal filtration.
5. Compare advantage and disadvantages of homogenizer and dynomill.
6. The solubility of protein is 15g/liter at ammonium sulphate concentration of 2.2M and 0.25g/liter at 3.0M.Calculate the solubility of the protein at 3.8M of the salt by cohn equation.
7. Define selectivity in Gel filtration chromatography and hydrophobic chromatography.
8. Differentiate between bound and unbound moisture content.
9. What is meant by the term NMWCO in ultra-filtration?
10. State the role of cyclone separator in the spray dryer.

PART B - (5 X16 = 80 Marks)

11. (a) (i) "Product yield also depends on the morphological and rheological behavior of fermentation broth". Justify this statement with industrial application. (10)

(ii) Explain the procedure to determine the rheological properties of fermentation broth. (6)

(OR)

(b) (i) Explain the procedure for the purification of histidine-tagged recombinant proteins. (10)

(ii) State the significant role of FPLC in protein purification. (6)

12. (a) (i) Explicate the working principle of ultrasonicator and its application. (8)

(ii) Differentiate between homogenizer and dynomill. (8)

(OR)

(b) (i) Give an account of the action of enzymes in cell disruption. How is the method useful in sequential release of products? (8)

(ii) Elaborate the application of enzymes in cell disruption. (8)

13. (a) (i) Using a test ultrafilter, we find the following data for a broth containing the antibiotic erythromycin and added filter aid: (10)

Filtration time (Sec)	Volume of filtrate (Liters)
5	0.040
10	0.055
20	0.080
30	0.095

The filter leaf has a total area of 0.1 ft^2 and the filtrate has a viscosity of 1.1 cP. The pressure drop in 20in of mercury and the feed contains 0.015 kg dry cake per liter. Determine the specific cake resistance α and the medium resistance R_M.

(ii) Enumerate the procedure to avoid choking in the ultrafiltration membrane. (6)

(OR)

(b) (i) Enumerate in detail about aqueous two phase extraction and compare it with normal solvent extraction. (8)

(ii) Describe the method to be used in industries for extraction if the product is proved in lab scale soxhlet apparatus. (8)

14. (a) (i) Discuss the scale up criteria used in chromatography technique for the purification of caffeine. (8)

(ii) Explain the principle of metal affinity chromatography with industrial application. (8)

(OR)

(b) How will you purify the recombinant proteins using Chromatography technique? Explain with suitable example. (16)

15. (a) (i) Elucidate the protocol for the purification of Cephalosporin. (8)

(ii) State the method and equipment used for fixing the size of the sugar during crystallization. (8)

(OR)

(b) (i) A batch of solid after separating from a continuous stirred tank fermenter for which the following table of data applies to be dried from 25% to 6% moisture under conditions identical to those for which the data were tabulated. The initial weight of the wet solid is 300 kg and the drying surface is 1 m^2/8 kg dry weight. Determine the time required for drying. (8)

X	0.35	0.25	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.064
N	0.3	0.3	0.3	0.266	0.239	0.208	0.180	0.150	0.097	0.07	0.025

(ii) Draw a spray dryer and explain the procedure to optimize the size of the powder particle. (8)