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Question Paper Code: 97D02

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Seventh Semester

Biotechnology

19UBT702- DOWNSTREAM PROCESSING

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10x 2 = 20 Marks)

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| 1. What is cell permeabilization and give example | CO1-U |
| 2. Outline the DSP steps in citric acid manufacture | CO2-App |
| 3. How is the Compressibility of a cake determining influence the filtration of fermentation broth? | CO2-App |
| 4. Highlight the factors affecting the centrifugation process | CO1-U |
| 5. What are adsorption isotherms? How are they obtained? | CO1-U |
| 6. Define q factor | CO1-U |
| 7. Classify different chromatographic techniques | CO1-U |
| 8. What is the importance of pI in separation technology? | CO1-U |
| 9. List out the equipments used for drying | CO1-U |
| 10. What is primary and secondary nucleation | CO1-U |

PART – B (5 x 16= 80 Marks)

11. (a) In a R&D cell of an industry, one of the team is working on the purification of recombinant insulin from bacteria. You are expected to identify a better physical method to disrupt the large volume of bacterial cell suspension to isolate the target protein and also give a flow chart for the further purification stages. Discuss about the principle of the cell disruption method selected for the process. Also suggest the methods that can be added to enhance the efficiency of disruption
- CO2-App (16)

Or

- (b) Classify different cell disruption methods and explain about any one mechanical method of cell disruption. CO2-App (16)
12. (a) Determine the position of particular particles as a function of time and volumetric flow rate of feed in a disc type centrifuge with the diagram and explain the different types of centrifuge. CO1-U (16)
- Or
- (b) Derive the necessary design equation to determine the time of batch filtration process. CO1-U (16)
13. (a) Classify different adsorption isotherms and plot necessary graph with appropriate design equations. CO2-App (16)
- Or
- (b) Demonstrate the principle and procedure in microfiltration and ultra filtration. CO2-App (16)
14. (a) If the protein of interest is stable at pH 5.5 and the isoelectric point of the protein is 7.1, then which type of ion exchange chromatography can be adopted to purify the protein? Justify with reason. Also explain in detail about the principle, matrix used, application of the same type of chromatography CO3- Ana (16)
- Or
- (b) It is decided to separate mixer of proteins containing Albumin (66 kDa), papin (12 kDa), Ovalbumin (46 kDa), Chymotrypsin (37 kDa), trypsin (22 kDa), plasminogen (95 kDa) using chromatography. Give the expected order of elution and explain the basic principles behind in the chromatography? CO3-Ana (16)
15. (a) Discuss the theory of batch Crystallization process CO1-U (16)
- Or
- (b) Write in details about lyophilization CO1-U (16)