Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14BT2020** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DOWNSTREAM PROCESSING** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Give an example for Filter aids. | CO1 | 1 |
| b. | Define sedimentation. | CO1 | 1 |
| c. | What are the advantages of a continuous rotary drum filter | CO1 | 2 |
| d. | What is equivalent time in centrifugation? | CO1 | 2 |
| e. | Write notes on the operation of tubular bowl centrifuge and disc stack bowl centrifuge. | CO1 | 14 |
| (OR) | | | | |
| 2. | a. | In continuous filtration the resistance of the filter medium is generally negligible to cake resistance. (True/ False) | CO1 | 1 |
| b. | What are the forces involved in centrifugal filtrations. | CO1 | 1 |
| c. | How is compressibility of a cake determined in filtration process? | CO1 | 2 |
| d. | What characteristics do you suggest for a filter media and give two examples for filter media. | CO1 | 2 |
| e.i | The specific resistance of the cake of biomass was found to vary with pressure drop as follows. Find the compressibility of the cake.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Pressure drop(kN/m2) | 330 | 134.3 | 46.1 | 21.1 | | Cake resistance (m/kg) | 3.56 X 1011 | 2.16 X 1011 | 1.45 X 1011 | 1.07 X 1011 | | CO1 | 7 |
|  | ii. | Explain about the centrifugal filtration. | CO1 | 7 |
| 3. | a. | The equation for Langmuir adsorption isotherm is \_\_\_\_\_\_\_\_\_. | CO2 | 1 |
|  | b. | Decaffeination of coffee is an application of \_\_\_\_\_\_\_\_\_ extraction process. | CO2 | 1 |
|  | c. | What is the effect of concentration polarization? | CO2 | 2 |
|  | d. | Write the advantages of solvent extraction? | CO2 | 2 |
|  | e. | Describe the methods used for the precipitation of proteins. | CO2 | 14 |
| (OR) | | | | |
| 4. | a. | Partition coefficient in extraction is ratio of \_\_\_\_\_\_\_. | CO2 | 1 |
|  | b. | Fouling in membranes is caused by \_\_\_\_\_\_\_\_. | CO2 | 1 |
|  | c. | Derive the empirical equation for freundlich isotherm. | CO2 | 2 |
|  | d. | What is reverse osmosis? | CO2 | 2 |
|  | e. | Derive the resistances involved in ultrafiltration and also explain its application. | CO2 | 14 |
|  |  |  |  |  |
| 5. | a. | Two types of detector used in HPLC are \_\_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
|  | b. | \_\_\_\_\_\_\_\_\_ involves the separation of proteins by isocratically formed pH gradient on an ion exchange column | CO2 | 1 |
|  | c. | What is pseudo affinity chromatography? | CO2 | 2 |
|  | d. | Define Retention time in column chromatography &write down the equation. | CO2 | 2 |
|  | e. | Write notes on   1. Ion exchange chromatography. 2. Reversed phase chromatography | CO2 | 14 |
| (OR) | | | | |
| 6. | a. | In \_\_\_\_\_\_\_\_\_ mobile phase is a fluid above and relatively close to its critical temperature and pressure. | CO2 | 1 |
|  | b. | \_\_\_\_\_\_\_\_ chromatography is widely used for protein purification. | CO2 | 1 |
|  | c. | What is the difference between isocratic and gradient chromatography? | CO2 | 2 |
|  | d. | Define partition coefficient in chromatography. | CO2 | 2 |
|  | e. | Describe the principle of bioaffinity and size exclusion chromatography. | CO2 | 14 |
|  |  |  |  |  |
| 7. | a. | The degree of supersaturation of a solution in crystallization is measured in terms of \_\_\_\_\_\_\_\_. | CO3 | 1 |
|  | b. | Write the rate of crystal growth equations--------------------. | CO3 | 1 |
|  | c. | What are finishing operations? | CO3 | 2 |
|  | d. | List out the different equipments in crystallization and drying | CO3 | 2 |
|  | e.i | A commercial drier needed 7 hrs to dry a material from a moisture content of 33% to one of 9% on dry basis. The critical moisture content of the material was 16% and the equilibrium moisture content was 5%. Determine the time needed to dry this material from a moisture content of 37% to 7% if the drying conditions remain unchanged. | CO3 | 10 |
|  | ii. | Write short note on Bound moisture and unbound moisture content | CO3 | 4 |
| (OR) | | | | |
| 8. | a. | Name the two important periods in drying are -----------------. | CO3 | 1 |
|  | b. | Heat and mass transfer takes place simultaneously during \_\_\_\_\_\_\_\_\_. | CO3 | 1 |
|  | c. | What is the principle of lyophilization? | CO3 | 2 |
|  | d. | Explain the term supersaturation coefficient in crystallization. | CO3 | 2 |
|  | e. | Write short notes on   1. Nucleation and Recrystallization 2. Purity of crystallization 3. Equipment for crystallization | CO3 | 6+4+4 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Cell disruption and release of the product in a bead mill may be described by \_\_\_\_\_\_\_\_ kinetics. | CO1 | 1 |
|  | b. | \_\_\_\_\_\_\_\_\_\_ metabolite is one that is formed during the growth phase of the organism. | CO1 | 1 |
|  | c. | What is the role of CTAB and SDS in cell disruption? | CO1 | 2 |
|  | d. | Name the physical methods used for cell disruption and explain anyone with an example | CO1 | 2 |
|  | e.i. | Write notes on the operation and functioning of homogenizer in cell disruption. | CO1 | 7 |
|  | ii. | Explain the chemical methods of cell disruption. | CO1 | 7 |

ALL THE BEST