Program: BE Biotechnology
Curriculum Scheme: Revised 2016
Examination: Final Year Semester VIII
Course Code: BTC802 and Course Name: Bioseperation & Downstream Processing technology- II
Time: 1 hour
Max Marks:50

1 Ion exchange chromatography is based on _____
(a) Electrical mobility of charged particles
(b) electrostatic force of attraction
(c) hydrphobic interactions
(d) hydrophilic interaction

2 Ion-exchange chromatography is used for the separation of _____
(a) polar molecules
(b) non-polar molecules
(c) hydrphobic molecules
(d) solid molecules

3 The choice of the ion exchanger depends upon _____
(a) the unstability of the test analytes
(b) the relative molecular mass of the test analytes
(c) the specific requirements of the Coagulation
(d) the specific requirements of the mixing

4 If gradient elution is to be used, the initial conditions chosen are such that the exchanger binds all the test analytes _____
(a) throughout the column
(b) at the top of the column
(c) at the bottom of the column
(d) at the periphery of the column

5 _____ tend to give better resolution with less peak tailing in ion exchange chromatography
(a) Continuous gradient elution
(b) Isocratic elution
(c) Both isocratic and gradient elution
(d) neither isocratic nor gradient elution

6 Matrices used for ion exchange chromatography include _____
(a) polypropelene
(b) sulphate
(c) agarose
(d) sucrose

7 The degree of cross-linking of an exchanger _____influences its capacity
(a) does
(b) does not
(c) barely
(d) sometimes

8 Physisorption is _____
(a) Exothermic and irreversible
(b) Exothermic and reversible
(c) Endothermic and irreversible
(d) Endothermic and reversible

9 _____is commonly used to remove H2S from synthetic gas
(a) ZnCl2
(b) ZnO
(c) ZnBr2
(d) ZnSO4

10 The anionic exchangers include _____
(a) Diethyaminoethyl
(b) Triethyl aminomethyl
(c) Quarternary aminomethyl
(d) Carboxymethyl

11 What is the use of cross flow in plate and frame module?
(a) Reduces fouling
(b) Reduces loss
(c) Reduces efficiency
(d) Increases efficiency

12 Removal of bacteria from cellular broths and fat removal process in the dairy industry falls in the category of
(a) Microfiltration
(b) Ultrafiltration
(c) Nano-filtration
(d) Reverse osmosis

13 The flow rate through the membrane filter itself expressed as gallon per square foot per day is:
(a) Permeate
(b) Headloss
(c) Flux
(d) Velocity

14 In dialysis, there is _____ pressure difference across the membrane
(a) little or no
(b) very high
(c) moderately high

(d) moderate

15 In dead end filtration _____

(a) the fluid flows perpendicular to the surface of the membrane

(b) the fluid flows parallel to the surface of the membrane

(c) Both (a) and (b)

(d) None of the above

16 The driving force in electrodialysis is

(a) moderately low pressure

(b) electric potential

(c) concentration difference

(d) high pressure

17 _____ does not cause membrane fouling

(a) slime formation

(b) backflushing with permeate

(c) microbial growth

(d) colloidal deposition

18 _____ is an example of inorganic membranes

(a) alumina

(b) polypropylene

(c) Both (a) and (b)

(d) None of the above

19 A raw water reservoir would be an example of which membrane pretreatment method (where the goal is to reduce the loading and fouling potential of the water fed to the membrane)?

(a) filtration

(b) clarification

(c) chemical treatment

(d) centrifugation

20 Pervaporation method involves

(a) Removal of ions

(b) Production of potable water

(c) Purification of aqueous streams

(d) Separation and concentration of liquid mixture.

21 Adsorption equilibrium is called as

(a) Adsorption isotherm

(b) Equilibrium adsorption

(c) Particulates adsorption

(d) Surface adsorption

22 A vertical cylindrical tube filled with adsorbent beads is

(a) Agitated reactor

(b) Tray reactor

(c) Fixed bed reactor

(d) Column reactor

23 CSTR stands for

(a) Continuous simple tank reactor

(b) Continuous simple tank reaction

(c) Continuous stirred tank reactor

(d) Continuous stirred tank reaction

24 The reversible phenomenon occurring at the surface of solid is

(a) Desorption

(b) Adsorption

(c) Absorption

(d) Equilibrium

25 The methods used to adsorb solutes from the liquid phase is

(a) Batch adsorption

(b) Continuous adsorption

(c) CSTR adsorption

(d) Discontinuous adsorption

26 The process where solid particles of specified size and shape are formed from a homogeneous phase is

(a) Packing

(b) Finishing

(c) Crystallization

(d) Formulation

27 Crystallization occurs only in

(a) Saturated solution

(b) Unsaturated solution

(c) Solute

(d) Solvent

28 Subsequent to nucleation or the addition of seed material formation of

(a) Saturated solution

(b) Unsaturated solution

(c) Crystal growth

(d) Supersaturation

29 Supersaturated solutions are thermodynamically

(a) Stable

(b) Volatile

(c) Non-volatile

(d) Unstable

30 The degree of supersaturation of a solution is measured in terms of
(a) Supersaturation equivalent
(b) Supersaturation coefficient
(c) Supersaturation solution
(d) Supersaturation solute
31 That point when the humidity decreases linearly with the drying conditions is known as
(a) Constant drying period
(b) Falling-rate period
(c) Heating region
(d) Critical region
32 Dryers can generate internal heating in the feed by
(a) Dielectric or inductive heating
(b) Convection
(c) Conduction
(d) Evaporation
33 Which dryer used radiation for drying?
(a) Spray dryer
(b) Drum dryer
(c) Flash dryer
(d) Microwave dryer
34 The moisture content of solid in excess of the equilibrium moisture content is referred as
(a) Bound moisture
(b) Free moisture
(c) Moisture
(d) Total Moisture
35 A propeller agitator
(a) Produces mainly axial flow
(b) Used for mixing high viscous pastes
(c) Runs at slow speed
(d) Used for low viscous fluids
36 Find the weight of the wet solid if dry solid is 2 kg and the moisture is 0.5 kg.
(a) 2 kg
(b) 2.5 kg
(c) 3 kg
(d) 3.5 kg
37 Find the moisture content in dry basis if the weight of dry solid is 5 kg and the moisture is 2 kg.
(a) 0.2
(b) 0.3
(c) 0.4
(d) 0.5
38 How does the heat transfer occurs in the indirect-heat continuous dryers?
(a) Conduction
(b) Convection
(c) Radiation
(d) Circulation
39 Which of the following is not the component of aeration and agitation system?
(a) Impeller
(b) Baffles
(c) Stirrer gland and bearing
(d) Thermometer
40 Find the moisture content in wet basis if the weight of the dry solid is 3 kg and the weight of the moisture is 2 kg.
(a) 0.1
(b) 0.2
(c) 0.3
(d) 0.4
41 Moisture content of a substance which exerts as equilibrium vapour pressure less than of the pure liquid at the same temperature is referred to as
(a) Bound moisture
(b) Unbound moisture
(c) Moisture
(d) Total Moisture
42 _____agents prevent the reformation of disulphide bonds between the amino acid molecules.
(a) Chaotropic
(b) Reducing
(c) Oxidising
(d) Hydrating
43 How are gamma interferon produced?
(a) Produced by virus-infected leukocytes
(b) Produced by virus-infected fibroblasts
(c) Produced by activated NK cells
44 Choose the correct statement
(a) Taq polymerase is having high processivity
(b) Processivity is defined in this case as a synthesis of DNA by polymerase
(c) It requires a 5’ end for the elongation to take place
(d) The maximum size of the molecules which can be synthesized is 10kbp

45 HCCF collection from mammalian cell culture stands for
(a) Hybridoma cell culture fluid
(b) Hyper cell culture fluid
(c) Harvested cell culture fluid
(d) High cell culture fluid
46 _____ solvent is used for extraction of Penicillin
(a) Butyl Acetate
(b) Alkyl Acetate
(c) Sodium Acetate
(d) Ethyl Acetate
47 Which of the following fungal strain is used for production of penicillin?
(a) Penicillium chrysogenum
(b) Streptomyces nodosus
(c) Bacillus subtilis
(d) Bacillus polymyxa
48 How is alpha interferon produced?
(a) Produced by virus-infected leukocytes
(b) Produced by virus-infected fibroblasts
(c) Produced by activated NK cells
(d) Produced by bacterial activated leukocytes
49 The major hazards of Monoclonal antibodies are
(a) Difficult in purification
(b) Contamination with retroviral particles from mouse myeloma cells
(c) Non specificity
(d) Infection
50 Most suitable long term storage method for recombinant Tissue Plasminogen Activator is
(a) Freezing
(b) Crystallization
(c) Drying
(d) Lyophilization
51 Which of the following enzyme is not present in S. cerevisiae?
(a) Maltase
(b) Invertase
(c) Zymase
(d) Cellulase
52 Regeneration of anion exchange Resin is usually done by using
(a) sodium hydroxide
(b) sodium chloride
(c) calcium chloride
(d) hydrochloric acid
53 Regeneration of cation exchange Resin is usually done by using
(a) hydrochloric acid
(b) sodium hydroxide
(c) sodium chloride
(d) calcium chloride
54 In some cases, physisorption of a gas adsorbed at low temperature may change into chemisorption at ____
(a) low temperatures
(b) high temperatures
(c) high adsorbent concentration
(d) low adsorbent concentration
55 Chemisorption involves _____
(a) no activation energy
(b) high activation energy
(c) very low activation energy
(d) moderately low activation energy
56 Physisorption involves _____
(a) no activation energy
(b) high activation energy
(c) very high activation energy
(d) low activation energy
57 Chemisorption is _____
(a) Exothermic and irreversible
(b) Exothermic and reversible
(c) Endothermic and irreversible
(d) Endothermic and reversible
58 _____ buffers are used in conjunction with anion exchangers
(a) Anionic
(b) Cationic
(c) Neutral
(d) Phosphate
59 _____ is not an anionic buffer
(a) acetate
(b) barbiturate
(c) phosphate
(d) Tris
60 The membrane separation technique is competing with other separation technologies in terms of
(a) Energy efficiency
(b) High separation capacity
(c) Selective separation and capital investments
(d) All of the above
61 Microfiltration and ultrafiltration fall in which category of membrane operations?
(a) Molecular separations
(b) Chemical transformations
(c) Mass and energy transfer between different phases
(d) None of the above

62 Dialysis in our kidney is a
(a) Pressure driven separation process
(b) Thermally driven separation process
(c) Concentration driven separation process
(d) None of the above
63 Membrane selection depends on a variety of factors including
(a) The composition of the feed solution
(b) Operating parameters
(c) Application types and separation goals
(d) All of the above
64 The flux of each component in pervaporation is proportional to
(a) concentration gradient
(b) diffusivity in the dense layer
(c) Both (a) and (b)
(d) None of the above
65 The first commercial application of pervaporation was for
(a) ethanol-water separation
(b) protein purification
(c) citric acid purification
(d) bioseparation of antibiotics
66 The separation mechanism in electrodialysis is _____
(a) sieving
(b) solution diffusion
(c) ion migration
(d) sieving and diffusion
67 Concentration polarization at the membrane surface is a _____
(a) Short term and irreversible effect
(b) short term and reversible effect
(c) long term and irreversible effect
(d) long term and reversible effect
68 A continuous type crystallizer designed to make large, uniform crystals is
(a) Oslo crystallizer
(b) Krystal crystallizer
(c) Swenson walker crystallizer
(d) Cooling crystallizer
69 Which are the types of crystallization?
(a) Evaporative crystallization
(b) Cycling crystallization
(c) Mixing crystallization
(d) Cooling crystallization
70 Crystallisation is based on the
(a) Difference in melting point
(b) Difference in boiling point
(c) Difference in pressure
(d) Difference in solubility
71 Which of the following is known as mother liquor?
(a) Solvent
(b) Solute
(c) Solution
(d) Filtrate
72 What is not an advantage of using mechanical agitation?
(a) High purity
(b) Uniform crystal size
(c) High purity
(d) Low rate of primary nucleation
73 The smallest portion of a crystal which when repeated in different directions generates the entire crystal is called:
(a) Lattice points
(b) Crystal lattice
(c) Unit cell
(d) None of the mentioned
74 A process in which solid particles of specified size and shape are formed from a homogeneous phase is
(a) Saturation
(b) Concentration
(c) Crystallization
(d) Finishing

75 Which of the following is not a common method used for purification?
(a) Sublimation
(b) Crystallisation
(c) Electrolysis
(d) Chromatography
76 Which one of the following is used to completely remove water and helps in preservation of foods?
(a) Desiccation
(b) Dehydration
(c) Drying
(d) Dewatering
77 Dehydration removes moisture _____ efficiency as Desiccation
(a) With less
(b) With more
(c) With same
(d) With very much larger
78 How the liquid does gets separated in freeze dryer?
(a) Boiling
(b) Distillation
(c) Freezing and crystallization
(d) Evaporation
79 Which materials are not used in drying in a freeze dryer?
(a) Seafood
(b) Fruits
(c) Pharmaceuticals
(d) Dyes
80 Which of the following method is technically and economically sound to dry out slurry from sewage plant?
(a) Tray Dryers
(b) Spray Dryers
(c) Drum Dryer
(d) Lyophilization
81 During drying process, why does the moisture content does not drop to 0 oC?
(a) Inability to dry out bound moisture
(b) Saturation of water vapours in the drying chamber
(c) Low grade drying instrument
(d) Inability to dry out unbound moisture
82 The non-agitated fermentations are carried out in vessels of a height/diameter ratio of _____
(a) 1 as 2
(b) 5 as 1
(c) 3 as 2
(d) 4 as 1
83 TAQ polymerase is sourced from _____
(a) Escherichia coli
(b) Pseudomonas aeruginosa
(c) Aspergillus niger
(d) Thermophilus aquaticus
84 What are antibiotics?
(a) Nutrient supplements
(b) Anti-cancer drugs
(c) Anti-microbial drugs
(d) Anti-ulcer drugs
85 _____ is a cleaved and converted into biologically active form of Insulin
(a) ProInsulin
(b) Prepinsulin
(c) B-Insulin
(d) Greater Insulin
86 Which of the following reagent is used for refolding of tissue plasminogen activator?
(a) Arginine
(b) Proline
(c) Threonine
(d) Valine
87 Which following method is used to inactivate endogenous virus from Monoclonal antibodies?
(a) Viral filtration
(b) Adsorption
(c) Chemical inactivation
(d) High pH
88 Which of the following activity is not present in Taq polymerase?
(a) 5′-3′ polymerase
(b) 5′-3′ exonuclease
(c) 3′-5′ exonuclease
(d) 3′- 5′polymerase
89 During dehydration step 200 Proof Ethanol grading refers to
(a) 100% absolute (undenatured) Ethyl Alcohol
(b) 90% absolute (undenatured) Ethyl Alcohol
(c) 80% absolute (undenatured) Ethyl Alcohol
(d) 70% absolute (undenatured) Ethyl Alcohol

90 Leavening agent for yeast describes as
(a) Expansion of dough
(b) Results in light airy physical structure
(c) Development of flavor
(d) Development of fragrance

91 The equilibrium characteristics of the solubility of a gas in liquid helps to determine the
(a) Rate
(b) Concentration
(c) Time
(d) No existence of equilibrium characteristics

92 As per the equilibrium solubility curve, the temperature increases partial pressure increases resulting in decreasing ….
(a) Concentration
(b) Equilibrium
(c) Solubility
(d) Absorption

93 Packed columns are better analyzed by:
(a) Mass transfer coefficients
(b) Equilibrium stage methods
(c) Graphical methods
(d) Algebraical methods

94 At the interface of liquid and vapor, which interface exists?
(a) Chemical
(b) Physical
(c) Thermal
(d) No equilibrium exists

95 Find the false statement for the better choice of the absorbent.
(a) Gas solubility should be high
(b) Vapour pressure should be low
(c) Viscosity should be high
(d) Low freezing point

96 Find the most common example for absorption.
(a) Ammonia and air in solvent water
(b) Ammonia and Carbon dioxide in solvent water
(c) Methane and air in solvent water
(d) Methane and Carbon dioxide in solvent water

97 Which of the following is not an example of ideal solution?
(a) Solution of benzene in toluene
(b) Solution of ethyl and propyl alcohol
(c) Paraffin hydrocarbon gas in paraffin oil
(d) Solution of isobutane and olefins

98 According to Raoult's law, for a pure component solution the partial pressure is equals to
(a) Total pressure
(b) Vapour pressure
(c) Atmospheric pressure
(d) Mole fraction of respective phase

99 Active insulin consists of how many polypeptide chains?
(a) 1
(b) 2
(c) 3
(d) 4

100 _____ affect the selectivity and flux through the membrane.
(a) Concentration polarization
(b) membrane fouling
(c) Both (a) and (b)
(d) Solubility