Program: BE Biotechnology
Curriculum Scheme: Revised 2016
Examination: Final Year Semester VIII
Course Code : CHDE8043
Course Name: Technology Stream: Advanced Separation Technology

Time: 1 hour Max. Marks: 50

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1		To get similar mass transfer characteristics in a packed column for the condition is:
	a	Empty bed contact time of the test plant is double of the full scale plant
	b	Empty bed contact time of the test plant is half of the full scale plant
	c	Empty bed contact time of the test plant is different from that of the full scale plant
	d	Empty bed contact time is equal for the test plant and full scale
2		What is the ratio of filtration rate in a pilot plant in adsorption studies to that of the filtration rate in actual packed column used for adsorption for the same organic load and adsorbent
	a	3
	b	1
	c	half
	d	quarter
3		What is the breakthrough volume in kL of an adsorption column for a volumetric flowrate of 200kL per day and breakthrough time of 7 days.
	a	1400000
	b	14
	c	14000
	d	1400
4		which of this is incorrect for moving bed adsorption
	a	The adsorbent can be regenerated as soon as its role in the adsorption step has been completed
	b	Heat transfer is better than in fixed bed

	c	The equipment required will be more complex than fixed bed
	d	Attrition of the adsorbent is not an issue
5		Which of the following is not a commercial application of reactive distillation?
	a	Esterification of acetic acid with ethanol
	b	Reaction of formaldehyde and methanol
	c	Reaction of isobutene and methanol
	d	Oxidation of ethyl alcohol
6		If the feed is _____ boiling azeotrope the solvet enters the column with the feed.
	a	Maximum
	b	Minimum
	c	Low
	d	High
7		In Azeotropic distillation _____ remains low
	a	Heat
	b	Volatility
	c	Relative volatility
	d	Enttopy
8		Find the distillation preferred for the binary mixture having component A and B with vapour pressure 360mmHg and 355mmHg.
	a	Multi-component distillation
	b	Reactive distillation
	c	Azeotropic distillation
	d	steam distillation
9		Supercritical fluid chromatography is particularly good for preparative separations because:

	a	one can use open tubular columns
	b	efficiency and/or flow rates typically are much higher than HPLC
	c	a large variety of mobile phases are used unlike with HPLC
	d	efficiency and/or flow rates typically are much higher than HPLC
10		In which chemical process, hydrophobic molecules are preferentially separated from a liquid solution in rising columns?
	a	Foam fractionation
	b	Membrane separation
	c	Adsorption
	d	Chromatographic separation
11		Which depressant does not affect flotation of Galena?
	a	Cyanide
	b	Lead
	c	Sulphide
	d	Copper
12		Pine oil used in froth flotation technique acts as a/an
	a	Collector
	b	Modifier
	c	Activator
	d	Frothers
13		In which technique, collector is added to cause bubble adherence on surface?
	a	Membrane separation
	b	Froth flotation
	c	Adsorption

	d	Super critical extraction
14		Which of the following is not true about solvent programming which is done in high performance liquid chromatography?
	a	It provides unequal bandwidths
	b	It provides fast overall separation
	c	It provides maximum resolution
	d	It provides maximum sensitivity
15		Which of the following is not a characteristic of the syringe pump used in high pressure liquid chromatography?
	a	Pressure capability is high
	b	Maintenance is frequent
	c	Limited reservoir capability
	d	Slight change of flow rate when extremely high pressure compresses the solvent
16		Syringe pumps used in High pressure liquid chromatography are most suitable for which of the following columns?
	a	Capillary columns
	b	Guard columns
	c	Short-fast columns
	d	Small bore columns
17		Which of the following cannot be done to reduce ripple in High pressure liquid chromatography?
	a	Using bellows
	b	Using restrictors
	c	Using long nylon tube between pump and column
	d	Avoiding the use of the solvent pump
18		Which of the following is not true about Hydraulic capacitance flow control system used in HPLC?
	a	It can be used only for liquids with low viscosity

	b	It is irrespective of solvent compressibility
	c	It maintains a constant flow
	d	It smoothens high pressure pump pulsations
19		Which of the following will improve the efficiency of the separation process in liquid chromatography?
	a	Increase in sample size, increase in column diameter
	b	Reduction in sample size, increase in column diameter
	c	Increase in sample size, reduction in column diameter
	d	Reduction in sample size, reduction in column diameter
20		Which of the following are the practical problems that arise due to the decrease in column diameter?
	a	Requirement of large particle size and high pressure drop
	b	Requirement of large particle size and low pressure drop
	c	Requirement of small particle size and high pressure drop
	d	Requirement of small particle size and low pressure drop
21		Which of the following columns are not used in liquid or high performance liquid chromatography?
	a	Analytical column
	b	Separation column
	c	Guard column
	d	Capillary column
22		Which of the following is not a Column-type Liquid chromatography?
	a	Gel permeation
	b	Ion exchange
	c	Liquid-solid
	d	Paper

23		Which of the following types of liquid chromatography uses immobilized biochemical as a stationary phase?
	a	Ion exchange chromatography
	b	Exclusion chromatography
	c	Affinity chromatography
	d	Gel permeation chromatography
24		follwing is the not a type of membrane based on structure and seperation method
	a	porous membrane
	b	non porous membrane
	c	carrier membranes
	d	nanoporous membrane
25		Which membranes are prepared by sintering?
	a	microfiltration
	b	ultrafiltration
	c	filtration
	d	nanofiltration
26		phase inversion is a trasformation of polymer from
	a	liquid to solid state
	b	solid to liquid state
	c	solid to gas state
	d	liquid to gas state
27		which of the technique does not generate the new polymers in membrane preparation?
	a	dip coating
	b	interfacial polymerization

	c	in situ polymerization
	d	plasma polymerization
28		The upper temperature limit for polymeric membranes is
	a	500 C
	b	1000 C
	c	100 C
	d	300 C
29		following is not the membrane charecterization technique
	a	dew point method
	b	bubble point method
	c	scanning electron microscopy
	d	mercury intrusion porometry
30		the transport through nonporous membrane is
	a	permeability = solubility * diffusivity
	b	diffusivity = solubility * permeability
	c	permeability = solubility / diffusivity
	d	solubility = permeability * diffusivity
31		in osmosis the flow of molecules is due to
	a	chemical potential
	b	vapor pressure
	c	partial pressure
	d	density
32		following is not a ceramic membrane

	a	polypropylene
	b	alumina
	c	zirconia
	d	titania
33		What does haemodialysis removes other than harmful wastes?
	a	Protein
	b	Salt
	c	Insulin
	d	Glycogen
34		The typical reverse osmosis assembly consist of following components
	a	pre treatment, membrane assembly, post treatment
	b	pre treatment , post treatment, membrane assembly
	c	membrane assembly, pre treatment , post treatment
	d	pre treatment
35		What is the bubble point method used for?
	a	To determine the pore size distribution
	b	To determine size of all pores
	c	To determine size of largest pore
	d	To determine membrane thickness
36		What is perporometry used for?
	a	To determine the size distribution of active pores
	b	To determine the size distribution of the dead pores
	c	To determine the size distribution of the membrane

	d	To see the permeability of the solvent through the membrane
37		How is the resistance to solvent flow determined?
	a	By measuring pore size distribution
	b	By measuring amount of air passing
	c	By measuring the volume of solvent passed after a certain time
	d	By calculating water permeability
38		What is the advantage of track etching?
	a	Pores are large
	b	Narrow size distribution
	c	Dense membrane
	d	Less expensive
39		Which of the following is not true about membrane separations?
	a	Components which are passed through the membrane is called permeate
	b	Components which are not passed through are called retentate
	c	Non-porous membrane is never used
	d	Membrane separations require a driving force
40		What is the driving force in Microfiltration?
	a	Pressure difference
	b	Pervaporation
	c	Difference in fugacity
	d	Concentration difference
41		The selection of membrane does not depend on which property?
	a	Pore size distribution

	b	Water permeability
	c	Perporometry
	d	Film thickness formed
42		What is the bubble point method used for?
	a	To determine the pore size distribution
	b	To determine size of all pores
	c	To determine size of largest pore
	d	To determine membrane thickness
43		following is the seperation process which uses size of the molecule property for the seperation
	a	filtration
	b	distillation
	c	extraction
	d	adsorption
44		following is the seperation process which uses vapor pressure property for the seperation
	a	filtration
	b	distillation
	c	extraction
	d	adsorption
45		following is the seperation process which uses Charge property for the seperation
	a	ion exchange
	b	filtration
	c	distillation
	d	extraction

46		Which of the following methods are liquid samples injected into the column in gas chromatography?
	a	Gas tight syringe
	b	Micro-syringe
	c	Rotary sample valve
	d	Solid injection syringes
47		Which of the following is the commonly used support material for the packed column in gas chromatography?
	a	Glass
	b	Metal
	c	Diatomaceous earth
	d	Stainless steel
48		Capillary columns are open tubular columns constructed from which of the following materials?
	a	Glass
	b	Metal
	c	Stainless steel
	d	Fused silica
49		Which of the following is not an ideal characteristic of a detector used in gas chromatography?
	a	Linear response to the solutes
	b	Short response time
	c	High reliability
	d	Sensitive to the changes in the flow rate of a carrier gas
50		Which of the following is not a type of detector used in gas chromatography?
	a	Argon ionisation detector
	b	Thermal conductivity detector

	c	UV visible spectrometric detector
	d	Electron capture detector
51		Which of the following is not the advantage of thermal conductivity detector used in gas chromatography?
	a	Simple in construction
	b	High sensitivity
	c	Large linear dynamic range
	d	Non-destructive character
52		Which of the following detectors is widely used to detect environmental samples like chlorinated pesticides and polychlorinated biphenyls?
	a	Flame ionization detector
	b	Thermal conductivity detector
	c	Argon ionisation detector
	d	Electron capture detector
53		Filter photometer detector is primarily responsive to which of the following compounds/elements?
	a	Volatile sulphur or phosphorous compounds
	b	Nitrogen
	c	Halogen
	d	Potassium
54		Thermionic emission detector used in gas chromatography is most sensitive to which of the following elements?
	a	Nitrogen
	b	Phosphorous
	c	Halogen
	d	Carbon
55		Which of the following is not true about High pressure liquid chromatography (HPLC)?

	a	It requires high pressure for the separation of the specious
	b	There is no need to vaporise the samples
	c	It is performed in columns
	d	It has high sensitivity
56		Which of the following is not an advantage of Syringe type pumps used in High pressure liquid chromatography?
	a	Independent of viscosity
	b	Pulse-less flow
	c	High pressure capability
	d	Unlimited solvent capacity