Program: BE Biotechnology
Curriculum Scheme: Revised 2016
Examination: Final Year Semester VIII
Course Code : CHDE8044
Course Name: Technology Stream: Polymer Technology

Time: 1 hour Max. Marks: 50

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1		Cross linked polymers are
	a	Thermoplastic
	b	Thermosetting
	c	Elastomer
	d	Fibres only
2		Thermoplastic materials
	a	Do not soften on application of heat
	b	Are heavily branched molecules
	c	Are solvent insoluble
	d	Soften on application of heat
3		Commercial production of polypropylene employs----Polymerization
	a	Emulsion
	b	Suspension
	c	Solution
	d	Bulk
4		The only natural thermoplastic resin, which is a product of animal life is
	a	Rosin
	b	Shellac

	c	Amber
	d	Copal
5		Polymers are classified into four categories namely thermosetting, thermoplastic, elastomer and fibre depending upon their
	a	Molecular sizes
	b	Magnitude of intermolecular forces
	c	Resistance to heat
	d	Polymerisation mechanism
6		Which of the following polymer type is not classified on the basis of its application and properties?
	a	rubbers
	b	plastics
	c	fibres
	d	synthetic
7		Thermosetting plastic materials
	a	Can be repeatedly melted
	b	Is useful for melt casting
	c	Cannot be melted after forming
	d	Is useful for spinning
8		In condensation polymerisation as compared to addition polymerisation
	a	The monomers are unsaturated compounds
	b	No co-product is lost
	c	The monomers contain two functional groups
	d	Generally only one monomer is involved
9		Which of the following is the lowest cost plastic commercially available?

	a	Polythene
	b	Teflon
	c	Bakelite
	d	PVC
10		Poly Vinyl chloride (PVC) is a____-Material
	a	Thermoplastic
	b	Thermosetting
	c	Fibrous
	d	Chemically active
11		Why does heat dissipation in bulk polymerization becomes progressively difficult with high conversions?
	a	increase in medium viscosity
	b	solubilization of polymer in the monomer
	c	precipitation of polymer in the monomer
	d	as reaction is very fast
12		In bulk polymerization viscosity of medium is
	a	Constant
	b	Increases
	c	Decreases
	d	Initially Increases and then decreases
13		Autoacceleration takes place in
	a	Bulk polymerization
	b	Solution polymerization
	c	Suspension polymerization

	d	Emulsion polymerization
14		Pick wrong statement that Polymerization involves
	a	Monomer
	b	Catalyst
	c	Solvent
	d	solid bed support
15		Select wrong statement pertaining to types of polymerization techniques are
	a	Bulk polymerization
	b	Suspension polymerization
	c	Emulsion polymerization
	d	Catalytic cracking
16		Bulk polymerization is used in polymerization of
	a	Methyl methyacrylate
	b	polyacrylonitrile
	c	polyethylene
	d	Polypropylene
17		Mass transfer become difficult in which following polymerization due to increase in viscosity
	a	Bulk polymerization
	b	Suspension polymerization
	c	Emulsion polymerization
	d	Solution polymerization
18		Which of the following monomer mixture is used in bulk polymerization?
	a	undiluted monomer

	b	monomer –solvent mixture
	c	monomer-water mixture
	d	monomer- inert mixture
19		Simplest method of polymerization is
	a	Bulk polymerization
	b	Suspension polymerization
	c	Emulsion polymerization
	d	Solution polymerization
20		How is the solvent in solution polymerization, more useful to overcome the disadvantages of bulk polymerization?
	a	it reduces the viscosity
	b	wide range of molecular weight of product
	c	does not causes chain transfer
	d	solvent easily recovered
21		Which of the following is a demerit of solution polymerization?
	a	handling of nonflammable solvents
	b	recovery of solvent
	c	causes chain transfer
	d	high viscosity causes less heat transfer
22		Which of the following polymerization system prepared by solution polymerization, is heterogeneous in character?
	a	methyl methacrylate
	b	Polyacrylonitrile
	c	polyethylene
	d	polypropylene

23		Which of the following polymerization is also known as pearl polymerization?
	a	bulk polymerization
	b	solution polymerization
	c	emulsion polymerization
	d	suspension polymerization
24		Only water-insoluble monomer can be polymerized by
	a	bulk polymerization
	b	solution polymerization
	c	emulsion polymerization
	d	suspension polymerization
25		In which polymerization method viscosity of medium does not increases throughout polymerization
	a	Bulk polymerization
	b	Suspension polymerization
	c	Emulsion polymerization
	d	Solution polymerization
26		The polymerization method have high conversion in shorter time
	a	Bulk polymerization
	b	Suspension polymerization
	c	Emulsion polymerization
	d	Solution polymerization
27		Which of the following polymerization system prepared by suspension polymerization?
	a	methyl methacrylate
	b	Polyacrylonitrile

	c	Ethylene
	d	Polystyrene bead
28		Which of the following polymer are not prepared by suspension polymerization?
	a	Polystyrene
	b	Styrene-divinyl benezene
	c	Polyvinyl acetate
	d	Polyacrylonitrile
29		What kind of monomer is used in the process of suspension polymerization?
	a	oil-soluble
	b	water-insoluble
	c	water soluble
	d	oil-water soluble
30		Pick wrong statement pertaining to the polymerization method requires longer time for high conversion
	a	Bulk polymerization
	b	Suspension polymerization
	c	Solution polymerization
	d	Emulsion polymerization
31		Which of the following is used as a stabilizer in suspension polymerization?
	a	gelatin
	b	peroxides
	c	water
	d	carbon tetrachloride
32		What is the size of the monomer droplets in suspension polymerization?

	a	25-30 mm
	b	0.1-5 mm
	c	15-20 mm
	d	50-60 mm
33		Which of the following polymerization technique allows the increase in both the rate and degree of polymerization simultaneously by increasing a certain parameter?
	a	bulk polymerization
	b	solution polymerization
	c	suspension polymerization
	d	emulsion polymerization
34		In case of simple molecules there is definiteness in molecular weight while for polymer molecular weight of different components is different therefore molecular weight is expressed as _____-
	a	Average molecular weight
	b	Molecular weight
	c	Cumulative molecular weight
	d	unpredictable
35		For all synthetic polymers Weight –average molecular weight is _____ number average molecular weight
	a	Smaller than
	b	Same as
	c	Greater than
	d	Not same as
36		On the basis of sedimentation behaviour average molecular weight can be expressed as
	a	Number average molecular weight
	b	Weight Average molecular weight
	c	Z-average molecular weight

	d	Cumulative molecular weight
37		Viscosity average molecular weight is expressed based on
	a	Flow Behaviour
	b	Sedimentation behaviour
	c	Degree of polymerization
	d	Diversity of monomers present
38		The size of polymer molecule depends on number of repeat units present in it. The number of units represents
	a	Monomer affinity
	b	Degree of polymerization
	c	Polydispersity
	d	Reactivity
39		Both degree of polymerization and molecular weight are related to
	a	monodispersity
	b	polydispersity
	c	Molecular size
	d	The relation cannot be predicted
40		If there are 1000 repeat units in a polymer then degree of polymerization is _____
	a	500
	b	100
	c	10000
	d	1000
41		Monodispesed means
	a	System with same molecules

	b	System with different molecules
	c	Relates with randomness in polymers
	d	System with different pro
42		Due to concept of polydispersity two polymers of same number average molecular weight may display _____properties
	a	Different
	b	Similar
	c	Close
	d	Virtually similar
43		The dispersity with respect to lowest to highest molecular weight homologues is expressed by a simple_____curve
	a	Polydispersity
	b	Average weight curve
	c	Monomer curve
	d	Molecular weight distribution curve
44		Molecular weight distribution curve represents _____
	a	Flow behavior of polymer
	b	Degree of polymerization
	c	Pattern of different molecular species present in polymer
	d	Sedimentation behaviour of the polymer
45		For synthetic polymers ratio of weight average molecular weight to number average molecular weight is
	a	Greater than 0
	b	Greater than 1
	c	Less than 1
	d	0

46		When a polymer sample has the narrow molecular weight distribution it has_____
	a	High polydispersity
	b	Non uniform polymer properties
	c	Lower polydispersity
	d	Divers repeat units
47		Properties of polymers such as melt viscosity, impact strength or tensile strength depend on _____
	a	Molecular weight
	b	Equivalent weight
	c	Mass fraction
	d	Polymer processing
48		Every polymer has its Degree of polymerization value below which the polymer does not possess any strength that DP value is called as
	a	Threshold Value
	b	Necking point
	c	Plait point
	d	Inflection point
49		Which of the following filler is used as a reinforcing agent for the polymers?
	a	carbon black
	b	wood flour
	c	Asbestos
	d	Silica
50		Choose wrong statement pertaining to polymer degradation is a change in the properties
	a	tensile strength
	b	Color

	c	Shape
	d	Increase in molecular weight
51		What kind of additives prevent the degradation of polymers while their processing and storage?
	a	stabilizers
	b	cross-linking agents
	c	plasticizers
	d	fillers
52		What is not the use of carbon black in polymer compounding to improve as an additive?
	a	as a filler
	b	as a colourant
	c	as a stablizier
	d	as a deodorizer
53		Polymer can suffer degradation mainly
	a	During fabrication
	b	In daily use
	c	In daily use and in fabrication process
	d	In light
54		Which does effect on Polymer degradation
	a	Mechanical stresses
	b	Solar radation
	c	Atmospheric oxygen
	d	nitrogen
55		Which is not polymer_____degradation method

	a	Chain end
	b	random
	c	addition
	d	photo
56		Many elastomers when exposed to _____ were found to crack on stretching
	a	nitrogen
	b	ozone
	c	carbon dioxide
	d	carbon disulphide
57		which of the atmospheric gas degrade polymers
	a	oxygen
	b	argon
	c	carbon dioxide
	d	argon
58		Which is not the mechanism of uncatalyzed photo-initiation of polymerization, when light of specific wavelength falls on monomer?
	a	monomer directly decomposes to give radicals
	b	monomer generates excites species by absorbing light quanta and then decompose into radicals by homolysis
	c	photo-initiator is added to monomer and decomposes to radicals by photolysis
	d	in presence of catalyst, momomer absorb light and decompose
59		What has the terms $k_d[I]$ in the overall rate equation of uncatalyzed photo-polymerization been replaced by?
	a	intensity of light radiation absorbed
	b	intensity of incident light
	c	number of pairs of chain radicals formed per quantum of light absorbed

	d	monomer concentration
60		What does the intensity of active radiation absorbed in uncatalyzed photo-polymerization, not depend on?
	a	thickness of reaction mixture
	b	intensity of incident radiation
	c	monomer concentration
	d	catalyst state
61		Pick th wrong statement for extrusion
	a	Extrusion is used for making pipes and rods
	b	Single screw extruder is the type of extrusion equipment
	c	Extrusion is used to form the flat sheets out of polymer melt
	d	Twin screw extruder is used for when higher shear rates are needed
62		The extruder barrel is devided intwo three parts namely
	a	Feed, compression section and metering section
	b	feed,electric heater and channeling section
	c	Feed, Flashing section and comression
	d	Feed, Filming section and metering section
63		What happens to the polymer feed as it moves to compression section
	a	Polymer is heated to melting point
	b	Polymer is reduced in size due to compression
	c	polymer is torn
	d	Polymer is mixed
64		In the metering section_____is appled through rotating screw
	a	Strain

	b	Shear stress
	c	Lateral force
	d	Elongation
65		_____is used to coat the wires with a plastic insulation
	a	rod die
	b	Ring shaped die
	c	Capillary die
	d	Flat die
66		_____is the simplest and least expensive polymer processing operations
	a	Extrusion
	b	Reaction injection molding
	c	Compression molding
	d	Injection molding
67		Injection molding is preferred for _____
	a	Thermosetting polymers
	b	Rubbers
	c	Glasses
	d	Thermoplastics
69		In case of transfer molding, the mold is_____prior to resin entry
	a	Closed
	b	Open
	c	Partially open
	d	Redirected

70		Transfer molding is used to mold parts _____
	a	With intricate geometries and fragile parts
	b	Pipes
	c	Wires
	d	Sheets
71		Pick the wrong statement
	a	Thermoforming is used for making plastic drinking cups
	b	Extrusion is useful for manufacturing pipes
	c	Molding is used to manufacture simple to complex geometries
	d	Reaction injection molding is the simplest molding
72		Thermoforming is an operation borrowed from metallurgy it can be used to make
	a	Keyboards
	b	Bottles
	c	Plastic bed liners & plastic drinking cups
	d	Car bumpers
73		Blow molding uses a _____ to expnd a hot perform against the form of a mold cavity to produce hollow objects
	a	Any fluid
	b	Liquid
	c	Air or nitrogen
	d	CO2
74		For larger bottles and tanks _____is used
	a	Extrusion blow molding
	b	Injection blow molding

	c	Compression molding
	d	Thermoforming
75		Rotational molding uses centrifugal force to force-coat the inside of the mold with molten resin the object formed has
	a	Uniform wall thickness
	b	Non-uniform wall thickness
	c	More surface irregularities
	d	Improper shape
76		In _____molten polymer is compressed in the small gap between two heated cylinders rotating in opposite directions
	a	Surface coating
	b	Calendering
	c	Injection molding
	d	Blow molding
77		What is the pressure range for the polymerization process of low density polyethylene
	a	1500-3000 atm
	b	100-1000 atm
	c	50-100 atm
	d	25-50 atm
78		What range of temperature is generally employed for low density polyethylene formation on kinetic considerations?
	a	25-50 ^{o}C
	b	170-250 ^{o}C
	c	200-400 ^{o}C
	d	50-150 ^{o}C
79		Which of the following can be used as an initiator for the formation of low density polyethylene (LDPE)?

	a	benzoyl peroxide
	b	sulphuric acid
	c	dithionite ion
	d	nitrobenzene
80		What is the affect of high pressure on the molecular weight of the polymer product formed?
	a	increases
	b	decreases
	c	no change
	d	cannot be determined
81		What is the possible heat of polymerization of ethylene?
	a	800-1000 cal/g
	b	164-180 cal/g
	c	200-400 cal/g
	d	80-100 cal/g
82		Which of the following are used as a promoter in the for formation of HDPE?
	a	sodium hydride
	b	hydrogen halide
	c	sulphuric acid
	d	molybdenum oxide
83		What is the approximate density of the polymer produced by the Ziegler process of polymerization?
	a	0.945 g/cm^3
	b	1.5 g/cm^3
	c	0.5 g/cm^3

	d	2.0 g/cm^3
84		Which of following kind of polyethylene has the highest degree of chain-branching?
	a	LDPE
	b	HDPE
	c	LLDPE
	d	cannot be determined
85		Which of the following category in properties can be considered as a limitation to the application of polyethylene?
	a	chemical inertness
	b	toxicity
	c	softening point
	d	insulation properties
86		Which of the following is true, when the density of LDPE is increased?
	a	crystallinity decreases
	b	permeability to liquid and gas decreases
	c	toughness increases
	d	Not determined
87		Which of the following kind of polymer has the highest percentage in polypropylene?
	a	isotactic
	b	atactic
	c	syndiotactic
	d	isoeccentric
88		What are the temperature and pressure conditions for the polymerization reaction of propylene?
	a	50-80 ^{o}C and 5-25 atm

	b	50-80 ^{o}C and 25-50 atm
	c	100-150 ^{o}C and 5-25 atm
	d	100-150 ^{o}C and 25-50 atm
89		Which of the following is used as a catalyst in the polymerization of propylene?
	a	MoO_2
	b	CrO_3+Al_2O_3
	c	Ni+Pt
	d	$TiCl_4$+$Al(C_2H_5)_3$
90		Which of the following properties of polypropylene makes it inferior, when compared with polyethylene?
	a	brittleness
	b	tensile strength
	c	clarity
	d	stress cracking resitance
91		Which among the following polymers is more prone to oxidation or aging?
	a	LDPE
	b	HDPE
	c	Polypropylene
	d	Polystyrene
92		Where among the following fields polypropylene cannot be used?
	a	insulating cables and wires
	b	home appliances
	c	automobile appliances
	d	furniture

93		Which of the following is used as a catalyst for the alkylation of benzene in the process of formation of styrene?
	a	$AlCl_3$
	b	MgO
	c	FeO
	d	$TiCl_4$
94		How many stages do the bulk polymerization of styrene passes through?
	a	2
	b	1
	c	3
	d	4
95		What kind of polymer is the commercially used polystyrene?
	a	syndiotactic
	b	isotactic
	c	atactic
	d	Not determined
96		Which of the following grade of polystyrene is useful in optical applications?
	a	general-purpose (GP-PS)
	b	high impact (HIPS)
	c	expanded grades
	d	PS
97		What is the effect of the outdoor exposure on polystyrene?
	a	lowering of melting point
	b	crazing and yellowing

	c	increased brittleness
	d	Increased Strength
98		Which of the following comonomer can copolymerize with styrene to give out a polymer suitable for making ion-exchange resins?
	a	vinyl acetate
	b	divinyl benzene
	c	acrylonitrile
	d	butadiene
99		What is the percentage value of elongation at break for polystyrene?
	a	1-3%
	b	100-300%
	c	20-130 %
	d	200-240%
100		How many methylol groups are present in a typical novolac molecule?
	a	3to5
	b	6-8
	c	0
	d	2
101		Which of the following phenolic resins are suitable for the decorative laminates?
	a	caustic soda catalyzed resols
	b	ammonia catalyzed resols
	c	spirit resols
	d	resites