M.Tech.(Polymer)

1. The feed state of polymer in extrusion undergoes following changes:

A) Solid to Liquid
B) Solid to Solid
C) Solid flakes to Gaseous
D) Gas to solid

2. 'Clearance' in extruder is best defined by:

A) Pressure in shaft
B) Diameter of shaft
C) Gap between shaft and screw threads
D) Radius of shaft

3. Molecular arrangement in polymers can be :

A) Branched B) Linear C) Cross linked D) All these

4. Glass transition temperature is not influenced by the following factor:

A) Internal mobility of chains
B) Melting point
C) Free volume
D) Attractive forces between molecules

5. Hydrolytic degradation of polymers takes place due to:

A) Molecular oxygen
B) Vulcanisation
C) Mechanical stress
D) Fire

6. The role of a plasticizer in processing is:

A) Changing physical properties
B) Lowering melting point
C) Both A & B
D) none

7. Following can be categorised as natural polymers:

A) Shellac B) PMMA C) PVC D) PP

8. The ratio of weight-average molecular weight to number average molecular weight is known as:

A) Z-average B) Viscosity average
C) PDI D) None

9. If weight-average molecular weight is equal to number average molecular weight then:

A) Polymer has linear chains
B) Polymer has equal sized molecules
C) Polymer has no molecules
D) Polymer hasn't formed out of the monomers

10. The osmotic pressure method is suitable for the number average molecular weight of given ranges:

A) 100-200
B) 6000-10000
C) 50000-1000000
D) 3000-5000

11. Poly-dispersity index generally lies in the following ranges:

A) 1-20 B) 0-1 C) 80-100 D) 110-200

12. Which of the following are condensation products:

A) PET B) PE C) PS D) PTFE

13. The parameters; temperatures of 140-170°C, oxide of Chromium as catalyst and pressure of 500 psi pertains to the HDPE manufacturing process named as:

A) Ziegler B) Indiana C) Philips D) None

14. PVC is manufactured by the following processes:

A) Emulsion B) Suspension C) None D) Both A &B

15. The reaction between the following produces Novolac resin:

A) Urea and formaldehyde
B) Phenol and formaldehyde
C) polyester and urethane
D) isocyanate and polyol

16. Polyurethanes do not find applications in the following products:

A) Foams B) Paints C) Tiles D) Coatings

17. A glue bottle can be manufactured with the following techniques:

A) Extrusion B) Injection moulding
C) Blow moulding D) Calendaring

18. The flattening of a tyre of a stationary van in the garage is an example of:

A) Creep
B) Stress relaxation
C) Both A & B

D) none of above

19. Spectroscopic techniques like FTIR help us to investigate the properties of polymers:

A) Optical properties
B) Thermal properties
C) Mechanical properties
D) Chemical properties

20. Components used in the under-the-hood in automobiles are best evaluated with the following technique:

A) Viscometer B) Rheometer C) HDT D) UTM

21. PC-ABS is used in the cell phone battery covers to make it impact resistant and maintain the long term uniformity in shape; PC-ABS can be classified as:

A) Composite
B) Blend
C) Alloy
D) None

22. Viscoelasticity in polymers is a unique property combination represented by Maxwell and Voigt models through a combination of:

A) Spring and pump
B) Dashpot and pump
C) Spring and dashpot
D) None of above

23. A continuous product like the sheathings of metallic wires is easily managed with the processing technique of polymers:

A) Injection moulding
B) Compression moulding
C) Thermoforming moulding
D) Extrusion moulding

24. The famous fibre Nylon is named after the :

A) Discoverers
B) Cities
C) Chemical source
D) None

25. Corrosion in polymers is mainly evaluated by the following:

A) Discolouration
B) Swelling

C) Both A & B
D) None

26. Izod and charpy tests for polymers is relevant to calculate the:
A) Impact resistance
B) Compressive strength
C) flexural strength
D) none

27. The S-N curve in plastics is relevant to the following:
A) Fatigue failure
B) Tensile testing
C) Both A & B
D) None

28. Prepeg technology is used to manufacture composites from:
A) Thermoplastics B) Thermosetting plastics
C) Recycle plastics D) None

29. "Dry ice", often used at concerts, is really solid carbon dioxide. The solid carbon dioxide sublimates and forms gas that then floats above the ice. What do we see when we look at the "fog" produced by dry ice machines?
A) We are looking at carbon dioxide gas
B) We are looking at water gas, formed by the carbon dioxide
C) We are looking at small droplets of liquid water, condensed by the carbon dioxide gas
D) None

30. Materials made from a single type of atom that cannot be broken down any further are called
A) Substances B) Elements C) Molecules D) Compounds

31. Which person listed below first contributed to a scientific understanding of modern atomic theory?
A) Democritus
B) John Dalton
C) James Clerk Maxwell
D) Francis Crick

32. A twin screw extruder mechanism is based on:
A) Co-rotation B) Counter rotation C) No rotation D) Both A & B

33. Following property can be measured from the DSC machine:

A) Glass transition temperature
B) Heat deflection temperature
C) Thermal expansion
D) None

34. Maxwell and Voigt models explain the properties of polymers for:

A) Flow B) Degradation
C) Mechanical strength D) None

35. Polymer usually have a tensile failure best defined by:

A) Brittle fracture B) Ductile fracture
C) None D) Cracking

36. Material used for making moulds in polymer products is:

A) Steel B) Wood C) Carbon D) Magnesium

37. Stereo isomerism in organic compounds can be best identified by:

A) Thermal testing like TGA B) Optical testing like Gloss
C) Chemical testing like FTIR D) None

38. IUPAC is the convention followed in organic compounds for:

A) Rating B) Ranking C) Testing D) Naming

39. A universal testing machine is used to determine the properties of polymers:

A) Optical B) Chemical C) Mechanical D) Rheological

40. Condensation polymerisation is different from addition polymerisation in following aspects:

A) No double bond if formed in the end
B) Monomer is different from mesomer
C) A molecule is released
D) All three above

41. The net power required to crush a feed havinmg volume surface mean diameter of 6cm to a product size having volume surface mean diameter of 2cm is 5kW/ton. What is the power required to crush a feed having volume surface mean diameter of 3cm to a product size having volume surface mean diameter of 1cm

A) 2.5 kW/ton B) 5kW/ton C) 10kW/ton D) 20kW/ton

42. Pick out the wrong statement

A) In Taylor standard screen the ratio of the area of opening in any screen to the next smaller screen is square root of 2

B) Gross energy required in (kWh/ton) to reduce very large feed to such a size that 80% of the product passes through 100micro m sceenis known as work index
C) Capacity and effectiveness of industrial screen are opposing factors
D) Operating speed of a ball mill should be between 60-80% of the critical speed

43. Maximum size reduction in a ball mill is done by:

A) Attrition B) Compression C) Impact D) Cutting

44. Stoke's law applies for:

A) Particle Reynolds number $N_{Re,p}<1$
B) $1000<N_{Re,p}<200,000$
C) Fairly large particles
D) None of the above

45. For an ideal fluid the value of N_{Re} is

A) 0 B) 1 C) Infinity D) None of these

46. Paste is an example of

A) Newtonian fluid B) Bingham plastic
C) Pseudoplastic D) Dilatants

47. Which of the following is correct statement:

A) Basic criteria required for separating two materials by classification is that their termional velocities in a given fluid must not be equal
B) Particles having tha same terminal velocity in a given fluid may have different size
C) Both (i) and (ii)
D) None of the above

48. 1poise is equal to:

A) 0.001kg/m sec B) 0.01kg/m sec
C) 0.1kg/m sec D) 1kg/m sec

49. In a Rota-meter when the gas flow rate increases, the position of the float rises in order to keep:

A) Drag force constant
B) Buoyancy force constant
C) Both A and B
D) None of the above

50. Throat to the pipe diameter is constant in:

A) Orifice-meter
B) Venturi-meter
C) Pitot-tube
D) All of the above

51. For fully developed flow the thickness of the boundary layer(Z_x) varies with distance from the leading edge(x) as

A) x B) $x^{1.5}$ C) $x^{0.5}$ D) $x^{0.8}$

52. For laminar flow conditions, the value of fanning friction factor(f) is given by:

A) $16/N_{Re}$
B) $24/N_{Re}$
C) $32/N_{Re}$
D) $64/N_{Re}$

53. 14 mesh screen indicates:

A) 14 holes per linear inch
B) 14 holes per square inch
C) 14 holes per linear foot
D) 14 holes per square foot

54. 1 Watts= …….BTU/hr

A) 0.51
B) 1.51
C) 2.51
D) None of these

55. Reflectivity of a perfect black body is:

A) 0
B) 1
C) Infinity
D) None of these

56. Identify the correct statement

A) Pr number played the same role in forced convection as played by Gr number in free convection
B) Fourier's law applies to heat transfer by convection
C) Transmitivity of glass is zero
D) All of the above are correct

57. Falling film evaporator can be used to concentrate

A) A heat sensitive material B) Orange juice
C) Both A & B D) None of these

58. Heat flux through a 50mm thick slab, if a temperature drop across the slab is 5 ^{0}C and its thermal conductivity is 0.1 Watts/m ^{0}C, is ……

A) $0.01W/m^2$
B) 0.10W/m
C) $10W/m^2$
D) $100W/m^2$

59. Pick out the wrong statement

A) Pressure drop in 2-4 heat exchanger is more compared with 1-2 heat exchanger
B) 2-4 heat exchanger stands for 2 shell and 4 tube passes
C) Baffles are used to induce turbulence in the heat transfer fluid
D) Boiling point of a given solute is non linear function of boiling point of the water at the same pressure

60. Thickness of thermal boundary layer

A) Increases with increase in thermal conductivity
B) Decreases with increase in thermal conductivity
C) Remains constant with increase in thermal conductivity
D) None of these

61. The units of heat transfer coefficient is

A) W/ m K B) W/m^2 K C) W/m^3 K D) $W/(m\ K)^2$

62. According to film theory, the average mass transfer coefficient (k_{ag}) related with the diffusivity(D) as

A) $k_{ag} \alpha D$ B) $k_{ag} \alpha D^{0.5}$ C) $k_{ag} \alpha D^{1.5}$ D) $k_{ag} \alpha D^2$

63. For a given separation which of the following is correct

A) Number of plates increases with increase in reflux ration
B) At total reflux, the reflux ratio is infinity
C) At minimum reflux ratio the number of plates are zero
D) None of the above

64. Diffusivity of gases varies as

A) $D \alpha T$
B) $D \alpha T0^{.5}$
C) $D \alpha T^{1.5}$
D) $D \alpha T^2$

65. No separation is possible for relative volatility (α)

A) $\alpha < 1$
B) $\alpha = 1$
C) $\alpha > 1$
D) $\alpha = 0$

66. Which of the following is the static characteristic of an instrument

A) Speed of response
B) Fiedality
C) Lag
D) Accuracy

67. Gauge pressure is equal to

A) Absolute pressure +atmospheric pressure
B) Absolute pressure - atmospheric pressure
C) Atmospheric pressure - absolute pressure
D) None of these

68. Resistances of most of the metals:

A) Decreases with temperature
B) Increases with temperature
C) Remains constant with temperature
D) None of these

69. Optical pyrometers are used to measure the temperature in the range of:

A) Less than 0 ^{0}F
B) Between 0 to 500 ^{0}F
C) Between 500 to 1000 ^{0}F
D) Between 1000 to 5000 ^{0}F

70. The moisture contained by a substance which exerts equilibrium vapor pressure less than that of the pure liquid at the same temperature is known as

A) Equilibrium moisture B) Bound moisture
C) Unbound moisture D) Free moisture

71. LMTD in case of counter current is

A) > LMTD in case of parallel current
B) = LMTD in case of parallel current
C) < LMTD in case of parallel current
D) None of these

72. High vacuum can be measured by using

A) Manometer B) Mcleod gage C) Bubbler system D) None of these

73. m^2/s is the unit of

A) Kinematic viscosity
B) Dynamic viscosity
C) Pressure
D) None of these

74. Reynolds number can be defined as the ratio of

A) Viscous/inertial force
B) Inertial/viscous force
C) Viscous/drag force
D) Drag/viscous force

75. Ethanol-water mixture

A) Forms a minimum boiling azeotrops

B) Forms a maximum boiling azeotropes
C) Shows negative deviation from ideality
D) Both A & B

x-x-x