

M.Tech.(Polymer)

1. For water when the pressure increases the viscosity
 - A) Also increases
 - B) Decreases
 - C) Remains constant
 - D) First decreases and then increases
2. The range value of critical Reynolds number for pipe flow is between
 - A) 2300-2900
 - B) 10000-10500
 - C) 100000-105000
 - D) 1000000-1050000
3. Discharge in laminar flow through a pipe varies
 - A) As the square of the radius
 - B) Inversely as the pressure drop
 - C) Inversely as the viscosity
 - D) As the square of the diameter
4. Pseudo plastic is a fluid for which
 - A) Dynamic viscosity decreases as the rate of shear increases
 - B) Newton's law of viscosity hold good
 - C) Dynamic viscosity increases as the rate of shear increases
 - D) Dynamic viscosity increases with the time for which shearing forces are applied
5. How does the head loss in turbulent flow in pipe vary?
 - A) Directly as velocity
 - B) Inversely as square of velocity
 - C) Approximately as square of velocity
 - D) Inversely as velocity
6. In continuous filtration (at a constant pressure drop), filtrate flow rate varies inversely as the
 - A) Filtration time only
 - B) Square of the viscosity.
 - C) Washing time only
 - D) Square root of the velocity.
7. Which of the following is not categorised as a "mechanical operation" ?
 - A) Agitation
 - B) Filtration
 - C) Size enlargement
 - D) Humidification
8. Equivalent diameter of a particle is the diameter of the sphere having the same
 - A) Ratio of surface to volume as the actual volume
 - B) Ratio of volume to surface as the particle
 - C) Volume as the particle
 - D) Diameter of its hemisphere
9. Pick out the wrong statement.
 - A) Size enlargement (opposite of size reduction) is not a mechanical operation.
 - B) Wear and tear in wet crushing is more than that in dry crushing of materials.
 - C) Recycled coarse material to the grinder by a classifier is termed as circulating load.

D) A 'dust catcher' is simply an enlargement in a pipeline which permits the solids to settle down due to reduction in velocity of the dust laden gas.

10. Moore filter is a _____ filter.

- A) Sand B) Press C) Rotary D) Leaf

11. Flapper nozzle is used in a/an _____ controller.

- A) Digital B) Pneumatic C) Hydraulic D) Electronic

12. Which of the following is not the triple point of water ?

- A) 273°K B) 32°F C) 492°R D) 32°R

13. The _____ of a vapor pressure thermometer is a functioning element.

- A) None of these B) Pointer C) Bourdon tube D) Bulb

14. Which of the following is an undesirable dynamic characteristic of an instrument ?

- A) Dead zone B) Time lag C) Reproducibility D) Static error

15. Reflectivity of a perfect black body is:

- A) 0 B) 1 C) Infinity D) 10

16. 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) Transmittivity of glass is zero
D) Rubber is not a polymer

17. Falling film evaporator can be used to concentrate

- A) A heat sensitive material B) Orange juice
C) Both A and B D) Ceramic

18. Heat flux through a 50mm thick slab, if a temperature drop across the slab is 5 °C and its thermal conductivity is 0.1 Watts/m °C, is

- A) 0.01W/m² B) 0.10W/m C) 10W/m² D) 100W/m²

19. 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

20. 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
21. The units of heat transfer coefficient is
A) $W/m K$ B) $W/m^2 K$ C) $W/m^3 K$ D) $W/(m K)^2$
22. According to film theory, the average mass transfer coefficient (k_{ag}) related with the diffusivity(D) as
A) $k_{ag} \propto D$ B) $k_{ag} \propto D^{0.5}$ C) $k_{ag} \propto D^{1.5}$ D) $k_{ag} \propto D^2$
23. 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) At total reflux, the reflux ratio is zero
24. Diffusivity of gases varies as
A) $D \propto T$ B) $D \propto T^{0.5}$ C) $D \propto T^{1.5}$ D) $D \propto T^2$
25. No separation is possible for relative volatility (α)
A) $\alpha < 1$ B) $\alpha = 1$ C) $\alpha > 1$ D) $\alpha = 0$
26. Which of the following is the static characteristic of an instrument
A) Speed of response B) Fidelity C) Lag D) Accuracy
27. Gauge pressure is equal to
A) Absolute pressure +atmospheric pressure
B) Absolute pressure - atmospheric pressure
C) Atmospheric pressure - absolute pressure
D) Absolute pressure x atmospheric pressure
28. Resistances of most of the metals:
A) Decreases with temperature B) Increases with temperature
C) Remains constant with temperature D) None of these
29. Optical pyrometers are used to measure the temperature in the range of:
A) Less than $0^\circ F$ B) Between 0 to $500^\circ F$
C) Between 500 to $1000^\circ F$ D) Between 1000 to $5000^\circ F$
30. 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
31. 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) Infinity
32. High vacuum can be measured by using
 A) Manometer B) McLeod gage C) Bubbler system D) None of these
33. The unit of is m^2/s
 A) Kinematic viscosity B) Dynamic viscosity
 C) Pressure D) None of these
34. 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
35. The ethanol-water mixture
 A) Forms a minimum boiling azeotropes B) Forms a maximum boiling azeotropes
 C) Shows negative deviation from ideality D) Can't be formed
36. In extractive distillation, solvent is
 A) Of high viscosity
 B) Present in overhead stream
 C) Added to alter the relative volatility of the mixture
 D) Not required
37. A flat plate of 4m length is kept parallel to air flowing at 5m/s at 15°C . Assuming the density of air to be $1.2\text{kg}/\text{m}^3$ and dynamic viscosity to be $1.76 \times 10^{-5} \text{ kg}/\text{m}\cdot\text{s}$ and knowing that the flow becomes turbulent when Reynolds number exceeds 5×10^5 , the flow will become turbulent at
 A) 1.25m B) 1.47m C) 1.52m D) 1.74m
38. A hydrometer weighs 0.03N and has a stem at the upper end which is cylindrical and 3mm in diameter. It will float deeper in oil of specific gravity 0.75, than in alcohol of specific gravity 0.8 by how much amount?
 A) 10.77mm B) 43.30mm C) 33.20mm D) 36.04mm
39. Tolerable limit of nitrogen oxides in air is _____ ppm.
 A) 0.1 B) 5 C) 25 D) 1
40. Exposure to small amount of _____ results in high blood pressure & heart disease in human beings.
 A) Asbestos B) Cadmium C) Mercury D) Hydrogen sulphide
41. Iron & manganese present as pollutant in water cannot be removed by
 A) Oxidation followed by settling & filtration.
 B) Lime soda process or manganese zeolite process.
 C) Chlorination.
 D) Ion exchange process.

42. Which of the following relationship is not correct in case of a chemical process plant ?
- Total product cost = direct production cost + plant overhead cost.
 - Manufacturing cost = direct product cost + fixed charges + plant overhead costs
 - General expenses = administrative expenses + distribution & marketing expenses
 - Total product cost = manufacturing cost + general expenses
43. In a manufacturing industry, breakeven point occurs, when the
- Total annual rate of production equals the assigned value.
 - Total annual product cost equals the total annual sales.
 - Annual sales equals the fixed cost.
 - Annual profit equals the expected value.
44. The total investment in a project is Rs. 10 lakhs and the annual profit is 1.5 lakhs. If the project life is 10 years, then the simple rate of return on investment is
- 150%
 - 15%
 - 1.5%
 - 10%
45. Nominal and effective interest rates are equal, when the interest is compounded
- Semi-annually
 - Quarterly
 - In no case, they are equal
 - Annually
46. The impure iron (pig iron) that is tapped out from blast furnace contains about _____ percent carbon.
- 4
 - 0.2
 - 8
 - 2
47. Sulphur melting pit in the sulphuric acid plant is made of
- Lead lined stainless steel
 - Cast iron
 - Hard wood
 - Steel or cement-brick lined
48. Coke oven regenerators are made of _____ bricks.
- Silica
 - High electrical conductivity
 - Fire clay
 - Low thermal conductivity
49. Residual magnetism in steel for magnets is increased by the addition of
- Nickel
 - Cobalt
 - Chromium
 - Tungsten
50. In an ideal gas mixture, fugacity of a species is equal to its
- Partial pressure
 - Chemical potential
 - Boiling point
 - Vapor pressure
51. When a system is in equilibrium for all possible processes, the differential or finite change of entropy is
- $\neq 0$
 - < 0
 - > 0
 - $= 0$
52. Helmholtz free energy (A) is defined as
- $A = H - TS$
 - $A = E - TS$
 - $A = H + TS$
 - $A = H \times TS$

53. One mole of nitrogen at 8 bar and 600 K is contained in a piston-cylinder arrangement. It is brought to 1 bar isothermally against a resisting pressure of 1 bar. The work done (in Joules) by the gas is
 A) 30554 B) 10373 C) 4364.9 D) 4988.4
54. A solute distributes itself between two non-miscible solvents in contact with each other in such a way that, at a constant temperature, the ratio of its concentrations in two layers is constant, irrespective of its total amount". This is
 A) The distribution law B) Followed from Margule's equation
 C) A corollary of Henry's law D) None of these
55. The adiabatic throttling process of a perfect gas is one of constant enthalpy
 A) In which there is a temperature drop
 B) In which there is an increase in temperature
 C) Which is exemplified by a non-steady flow expansion
 D) Which can be performed in a pipe with a constriction
56. A gas performs the maximum work, when it expands
 A) Non-uniformly B) Isobarically C) Isothermally D) Adiabatically
57. Pressure-enthalpy chart is useful in refrigeration. The change in internal energy of an ideal fluid used in ideal refrigeration cycle is
 A) Zero B) Negative C) Positive D) Infinity
58. Molar heat capacity of water in equilibrium with ice at constant pressure is _____ Kcal/kg mole . °K
 A) ∞ B) 15 C) 5 D) 10
59. In a solution containing 0.30 Kg mole of solute and 600 kg of solvent, the molality is
 A) 1 B) 0.60 C) 0.50 D) 2
60. Mass transfer rate between two fluid phases does not necessarily depend on the _____ of the two phases.
 A) Interfacial area B) Degree of turbulence
 C) Physical properties D) Chemical properties
61. In batch distillation with constant reflux, overhead product composition _____ with time.
 A) Does not vary
 B) May increase or decrease, depends on the system
 C) Decreases
 D) Increases
62. Overall efficiency of the distillation column is
 A) The ratio of number of ideal plates to actual plates
 B) Always more than the point efficiency
 C) The ratio of number of actual plates to ideal plates

- D) Same as the Murphree efficiency
63. Nylon-6 is manufactured from
 A) Caprolactum
 B) Adipic acid and hexamethylene diamine
 C) Sebasic acid and hexamethylene diamine
 D) Maleic anhydride and hexamethylene diamine
64. The main use of butadiene is
 A) In the manufacture of synthetic rubber
 B) As a plasticiser for unsaturated polyester
 C) Making brushes
 D) As an anti-skimming agent in paint
65. In a cross linked polymer, the monomeric units are linked together to constitute a three dimensional network. Which of the following is a cross-linked polymer ?
 A) Nylon-6
 B) Polyester
 C) Polythene
 D) Bakelite (phenol formaldehyde)
66. Tubeless tyres are made of _____ rubber, which is a co-polymer of isoprene & isobutylene.
 A) Silicone
 B) Butyl
 C) Neoprene
 D) Nitrile
67. Thiokol is nothing but
 A) Polysulphide rubber
 B) Polyamide fibre
 C) Expended polystyrene
 D) Engineering plastic
68. Steam reforming of naphtha is a source of hydrogen production for nitrogeousfertiliser industry. What is the usual ratio of steam to carbon maintained in the process of steam reforming of naphtha ?
 A) 1.5:1
 B) 3.5:1
 C) 10:1
 D) 15:1
69. Hydrogen content of coke oven gas is _____ percent.
 A) 84
 B) 4
 C) 58
 D) 22
70. Pick out the wrong statement.
 A) Calcium cyanamide is used as weed killer in onion fields.
 B) The phosphorous nutrient makes the plant stem stronger and increases its branches.
 C) A straight fertilizer contains only one nutrient.
 D) All the nitrogenous fertilizers are not soluble in water.
71. A universal testing machine is used to determine which of the properties of polymers:
 A) Optical
 B) Chemical
 C) Mechanical
 D) Rheological
72. Maxwell and Voigt models explain the properties of polymers for:
 A) Flow
 B) Degradation
 C) Mechanical strength
 D) Optical

- 73.** A twin screw extruder mechanism is based on:
- A) Co-rotation B) Counter rotation C) No rotation D) Both A & B
- 74.** Corrosion in polymers is mainly evaluated by the following:
- A) Discoloration B) Swelling C) Both A & B D) Iron oxide film
- 75.** Izod and charpy tests for polymers is relevant to calculate the:
- A) Impact resistance B) Compressive strength
C) Flexural strength D) Scratch resistance

x-x-x