**CHEMICAL ENGINEERING**

1. Measurement of the amount of dry gas collected over water from volume of moist gas is based on

|  |  |
| --- | --- |
| (A) | Charle's law |
| (B) | Dalton's law of partial pressures |
| (C) | Avogadro's hypothesis |
| (D) | Boyle's law |

2. Validity of the relationship, inputs = outputs, holds for system at steady state

|  |  |
| --- | --- |
| (A) | with chemical reaction |
| (B) | without chemical reaction |
| (C) | without chemical reaction and losses |
| (D) | None of the above |

3. N.T.P. corresponds to

|  |  |
| --- | --- |
| (A) | 1 atm. absolute pressure and 0°C |
| (B) | 760 mm Hg gauge pressure and 0°C |
| (C) | 760 torr and 15°C |
| (D) | 101.325 KPa gauge pressure and 0°C |

4. 1 bar is almost equal to ………….. atmosphere.

|  |  |
| --- | --- |
| (A) | 1 |
| (B) | 10 |
| (C) | 100 |
| (D) | 1000 |

5. Number of gm moles of solute dissolved in one litre of a solution is called its

|  |  |
| --- | --- |
| (A) | equivalent weight |
| (B) | molarity |
| (C) | molality |
| (D) | normality |

6. Number of gm moles of solute dissolved in 1 kg of solvent is called its

|  |  |
| --- | --- |
| (A) | normality |
| (B) | molality |
| (C) | molality |
| (D) | equivalent weight |

7. Number of gram equivalent of solute dissolved in one litre of solution is called its

|  |  |
| --- | --- |
| (A) | normality |
| (B) | molarity |
| (C) | molality |
| (D) | None of the above |

8. Kinetic theory of gas stipulates that, the

|  |  |
| --- | --- |
| (A) | energy is lost during molecular collisions |
| (B) | molecules possess appreciable volume |
| (C) | absolute temperature is a measure of the kinetic energy of molecules |
| (D) | None of the above |

9. For an ideal gas, the compressibility factor

|  |  |
| --- | --- |
| (A) | decreases with pressure rise |
| (B) | is unity at all temperature |
| (C) | is unity at Boyle's temperature |
| (D) | zero |

10. Real gases approach ideal behaviour at

|  |  |
| --- | --- |
| (A) | high pressure and high temperature |
| (B) | low pressure and high temperature |
| (C) | high pressure and low temperature |
| (D) | low pressure and low temperature |

11. Gases diffuse faster compared to liquids because of the reason that the liquid molecules

|  |  |
| --- | --- |
| (A) | are held together by stronger intermolecular forces |
| (B) | move faster |
| (C) | have no definite shape |
| (D) | are heavier |

12. Which of the following is followed by an ideal solution?

|  |  |
| --- | --- |
| (A) | Boyle's law |
| (B) | Amgat's law |
| (C) | Raoult's law |
| (D) | Trouton's rule |

13. Volume percent for gases is equal to

|  |  |
| --- | --- |
| (A) | weight percent |
| (B) | mole percent |
| (C) | weight percent only for ideal gases |
| (D) | mole percent only for ideal gases |

14. A bypass stream in a chemical process is useful, because it

|  |  |
| --- | --- |
| (A) | facilitates better control of the process |
| (B) | improves the conversion |
| (C) | increases the yield of products |
| (D) | None of the above |

15. Average molecular weight of air is about

|  |  |
| --- | --- |
| (A) | 21 |
| (B) | 29 |
| (C) | 23 |
| (D) | 79 |

16. Pick out the correct statement.

|  |  |
| --- | --- |
| (A) | Heat of solution is always positive |
| (B) | At equilibrium, ΔG is zero |
| (C) | For the reaction, PCl5 ↔ PCl3 + C12, ΔH is less than ΔE |
| (D) | The heating of water in a beaker is an isolated system |

17. An equation for calculating Vapour pressure is, log10 *P* =*A – B*/(*t + c*). This is called

|  |  |
| --- | --- |
| (A) | Kistyakowsky equation |
| (B) | Antonie equation |
| (C) | Kopp's rule |
| (D) | Trouton's rule |

18. Catalyst used in manufacture of sulphuric acid by chamber and contact process are respectively

|  |  |
| --- | --- |
| (A) | V2O5 and Cr2Os |
| (B) | Oxides of nitrogen and Cr2Os |
| (C) | V2O5 on a porous carrier and oxides of nitrogen |
| (D) | Oxides of Nitrogen and V2O5 on a porous carrier |

19. Contact process

|  |  |
| --- | --- |
| (A) | yields acid of higher concentration than chamber process |
| (B) | yields acids of lower concentration than chamber process |
| (C) | is obsolete |
| (D) | eliminates absorber |

20. 20% oleum means that in 100 Kg, there are 20 Kg of

|  |  |
| --- | --- |
| (A) | SO2 and 80 Kg of H2SO4 |
| (B) | H2SO4 and 80 Kg of SO3 |
| (C) | SO3 for each 100 Kg of H2SO4 |
| (D) | None of the above |

21. Producer gas consists mainly of

|  |  |
| --- | --- |
| (A) | CO, CO2, N2, H2 |
| (B) | CO, H2 |
| (C) | H2,CH4 |
| (D) | C2H2, CO2, H2 |

22. Oxygen is produced by fractionation of air using

|  |  |
| --- | --- |
| (A) | Linde's process |
| (B) | Claude's process |
| (C) | both Linde's and Claude's process |
| (D) | None of the above |

23. Raw materials for 'Solvay Process' for manufacture of the soda ash are

|  |  |
| --- | --- |
| (A) | salt, limestone and coke or gas |
| (B) | ammonia, salt and limestone |
| (C) | ammonia limestone and coke |
| (D) | None of the above |

24. Economics of 'Solvary Process' depends upon the efficiency of

|  |  |
| --- | --- |
| (A) | carbonating tower |
| (B) | ammonia recovery |
| (C) | ammonia recovery and size of plant |
| (D) | ammoniation of salt solution |

25. Mercury cells for caustic soda manufacture, compared to diaphragm cells

|  |  |
| --- | --- |
| (A) | require lower initial investment |
| (B) | require more power |
| (C) | produce lower concentration NaOH |
| (D) | None of the above |

26. Cement mainly contains

|  |  |
| --- | --- |
| (A) | CaO, SiO2, Al2O3 |
| (B) | MgO, SiO2,K2O |
| (C) | Al2O3, MgO, Fe2O3 |
| (D) | CaO, MgO, K2O |

27. Gypsum is

|  |  |
| --- | --- |
| (A) | Calcium Chloride |
| (B) | Potassium Sulphate |
| (C) | Sodium Sulphate |
| (D) | Calcium Sulphate |

28. Glauber's salt is

|  |  |
| --- | --- |
| (A) | Calcium Sulphate |
| (B) | Potassium Sulphate |
| (C) | Potassium Chlorate |
| (D) | None of the above |

29. Widely used method for conditioning of boiler feed water is

|  |  |
| --- | --- |
| (A) | cold lime process |
| (B) | coagulation |
| (C) | hot-lime soda process |
| (D) | sequestration |

30. Hydrazine is largely used

|  |  |
| --- | --- |
| (A) | as a starting material for 'hypo' |
| (B) | in photographic industry |
| (C) | as rocket fuel |
| (D) | in printing industry |

31. Trinitro-toluene is

|  |  |
| --- | --- |
| (A) | used in glycerine manufacture |
| (B) | an explosive |
| (C) | used in dye manufacture |
| (D) | None of the above |

32. Oil is

|  |  |
| --- | --- |
| (A) | a mixture of glycerides |
| (B) | a mixture of glycerides of fatty acids |
| (C) | solid at normal temperature |
| (D) | ester of alcohols other than glycerine |

33. Wax is

|  |  |
| --- | --- |
| (A) | a mixture of glycerides |
| (B) | a mixture of esters of Polyhydric alcohols excepting glycerine |
| (C) | liquid at room temperature |
| (D) | a mixture of glycerides of fatty acids |

34. Unsaturated oils compared to saturated oils have

|  |  |
| --- | --- |
| (A) | lower melting point and higher reactivity to oxygen |
| (B) | higher melting point and higher reactivity to oxygen |
| (C) | lower melting point and lower reactivity to oxygen |
| (D) | higher melting point and lower reactivity to oxygen |

35. Rancidity of oil can be reduced by

|  |  |
| --- | --- |
| (A) | decoloration |
| (B) | hydrogenation |
| (C) | oxidation |
| (D) | purification |

36. The unit of volumetric diffusivity is

|  |  |
| --- | --- |
| (A) | cm2/sec |
| (B) | cm/sec |
| (C) | cm3/sec |
| (D) | cm2/sec2 |

37. Molecular diffusion is caused by

|  |  |
| --- | --- |
| (A) | transfer of molecules from low concentration to high con­centration region |
| (B) | thermal energy of the molecules |
| (C) | activation energy of the molecules |
| (D) | potential energy of the molecules |

38. Mass transfer co-efficient is defined as

|  |  |
| --- | --- |
| (A) | Flux = Co-efficient/concentration difference |
| (B) | Co-efficient = Flux/concentration difference |
| (C) | Flux = concentration difference/co-efficient |
| (D) | None of the above |

39. In physical terms, Schmidt number means

|  |  |
| --- | --- |
| (A) | thermal diffusivity/mass diffusivity |
| (B) | thermal diffusivity/momentum diffusivity |
| (C) | momentum diffusivity/mass diffusivity |
| (D) | mass diffusivity/thermal diffusivity |

40. At the same gas flow rate, the pressure drop in a packed tower being irrigated with liquid ……………that in dry packed tower.

|  |  |
| --- | --- |
| (A) | is greater than |
| (B) | is lower than |
| (C) | is same as |
| (D) | cannot be predicted as data are insufficient |

41. Which of the following is an undesirable property in a tower packing?

|  |  |
| --- | --- |
| (A) | large surface per unit volume |
| (B) | large free cross-section |
| (C) | low weight per unit volume |
| (D) | large weight of liquid retained |

42. Raoult's law is applicable to

|  |  |
| --- | --- |
| (A) | ideal solutions |
| (B) | real solutions |
| (C) | the mixture of water and alcohol |
| (D) | non-ideal gases |

43. Flash distillation is

|  |  |
| --- | --- |
| (A) | same as differential distillation |
| (B) | used for multi component systems like crude refining |
| (C) | same as simple distillation |
| (D) | most useful for handling binary system |

44. In a binary system, separation is very efficient when relative volatility is

|  |  |
| --- | --- |
| (A) | 1 |
| (B) | > 1 |
| (C) | < 1 |
| (D) | 0.5 |

45. Positive deviation from Raoult's law means a mixture whose total pressure is

|  |  |
| --- | --- |
| (A) | greater than that computed for ideality |
| (B) | less than that computed for ideality |
| (C) | less than the sum of the vapour pressure of the components |
| (D) | None of the above |

46. In azeotropic mixture, the equilibrium vapour composition is

|  |  |
| --- | --- |
| (A) | more than liquid composition |
| (B) | less than liquid composition |
| (C) | same as liquid composition |
| (D) | independent of pressure |

47. In rectifying section of a continuous distillation column

|  |  |
| --- | --- |
| (A) | vapour is enriched with low boilers |
| (B) | vapour is enriched with high boilers |
| (C) | liquid is stripped of high boilers |
| (D) | None of the above |

48. Molecular distillation is

|  |  |
| --- | --- |
| (A) | high temperature distillation |
| (B) | for heat-sensitive materials |
| (C) | very low pressure distillation |
| (D) | Both (B) and (C) |

49. In steam distillation, the

|  |  |
| --- | --- |
| (A) | temperature is 100°C |
| (B) | temperature is more than 100°C |
| (C) | product must be immiscible with water |
| (D) | temperature is higher than the boiling point of either component |

50. Steam distillation is used to separate

|  |  |
| --- | --- |
| (A) | azeotropes |
| (B) | high boiling substances from non-volatile impurities |
| (C) | heat sensitive materials |
| (D) | mixtures of low relative volatility |

51. What is the reflux ratio at total reflux?

|  |  |
| --- | --- |
| (A) | Zero |
| (B) | Infinity |
| (C) | Unity |
| (D) | Data insufficient to predict |

52. Which of the following is the most suitable for extraction in a system having very low density difference?

|  |  |
| --- | --- |
| (A) | Mixer-settler extractor |
| (B) | Centrifugal extractor |
| (C) | Pulsed extractor |
| (D) | Packed extraction tower |

53. The solvent used in liquid extraction should not have high latent heat of vaporisation, because

|  |  |
| --- | --- |
| (A) | the pressure drop and hence the pumping cost will be very high |
| (B) | it cannot be recovered by distillation |
| (C) | its recovery cost by distillation may be prohibitatively high |
| (D) | it will decompose while recovering by distillation |

54. Rate of leaching increases with increasing

|  |  |
| --- | --- |
| (A) | temperature |
| (B) | viscosity of solvent |
| (C) | pressure |
| (D) | size of the solid |

55. Chemisorption (chemical adsorption) is

|  |  |
| --- | --- |
| (A) | same as "van der Waals" adsorption |
| (B) | characterized by adsorption of heat |
| (C) | an irreversible phenomenon |
| (D) | a reversible phenomenon |

56. Swenson-Walker crystalliser is a

|  |  |
| --- | --- |
| (A) | Continuous unit |
| (B) | Batch unit |
| (C) | Semi-batch unit |
| (D) | Cooling (adiabatic)-cum-evaporation device |

57. Moisture in a solid exerting an equilibrium vapour pressure equal to that of the pure liquid at the same temperature is called

|  |  |
| --- | --- |
| (A) | Unbound moisture |
| (B) | Critical moisture |
| (C) | Free moisture |
| (D) | Bound moisture |

58. The falling rate period in the drying of a solid is characterized by

|  |  |
| --- | --- |
| (A) | increase in rate of drying |
| (B) | increasing temperatures both on the surface and within the solid |
| (C) | decreasing temperatures |
| (D) | None of the above |

59. Agitator is provided in a crystallizer for

|  |  |
| --- | --- |
| (A) | Avoiding deposition on cooler surfaces |
| (B) | Formation of nuclei |
| (C) | Crystal growth |
| (D) | All (A), (B) and (C) |

60. In liquid extraction, if selectivity is unity, then

|  |  |
| --- | --- |
| (A) | Separation of the constituents is the most effective |
| (B) | No separation will occur |
| (C) | Amount of solvent required will be minimum |
| (D) | Solvent flow rate should be very low |

61. Loss of heat from un lagged steam pipe to the ambient air is by

|  |  |
| --- | --- |
| (A) | conduction |
| (B) | convection |
| (C) | radiation |
| (D) | All of the above |

62. Fourier's law of heat conduction applies to

|  |  |
| --- | --- |
| (A) | convection |
| (B) | radiation |
| (C) | conduction |
| (D) | All of the above |

63. Fourier's law of heat conduction applies to

|  |  |
| --- | --- |
| (A) | isothermal surface |
| (B) | non-isothermal surface |
| (C) | Both (A) and (B) |
| (D) | None of the above |

64. Unsteady state heat conduction occurs when

|  |  |
| --- | --- |
| (A) | temperature distribution is independent of time |
| (B) | temperature distribution is dependent on time |
| (C) | heat flows in one direction only |
| (D) | three dimensional heat flow is concerned |

65. What is the unit of thermal conductivity?

|  |  |
| --- | --- |
| (A) | kcal/hr. m2 °C |
| (B) | kcal/hr.m.°C |
| (C) | kcal/hr.m |
| (D) | kcal/hr. °C |

66. The unit of heat transfer co-efficient is

|  |  |
| --- | --- |
| (A) | BTU/hr. ft2 °F |
| (B) | BTU/hr. °F. ft. |
| (C) | BTU/hr. °F |
| (D) | BTU/hr. ft |

67. Which of the following is correct?

|  |  |
| --- | --- |
| (A) | Rate = Driving force × Resistance |
| (B) | Driving force = Rate × Resistance |
| (C) | Resistance = Driving force × Rate |
| (D) | Rate = Resistance /Driving force |

68. An insulator should have

|  |  |
| --- | --- |
| (A) | low thermal conductivity |
| (B) | high thermal conductivity |
| (C) | less resistance to heat flow |
| (D) | a porous structure |

69. Heat flux through several resistances in series is analogous to the current flowing through several

|  |  |
| --- | --- |
| (A) | resistances in parallel |
| (B) | capacitors in series |
| (C) | resistances in series |
| (D) | None of the above |

70. The overall resistance, for heat transfer through a series of flat resistance, is the …………… of the resistances.

|  |  |
| --- | --- |
| (A) | average |
| (B) | geometric mean |
| (C) | product |
| (D) | sum |

71. Which of the following has the highest thermal conductivity?

|  |  |
| --- | --- |
| (A) | Brick |
| (B) | Air |
| (C) | Water |
| (D) | Silver |

72. Which area is used in case of heat flow by conduction through cylinder?

|  |  |
| --- | --- |
| (A) | Logarithmic mean area |
| (B) | Arithmetic mean area |
| (C) | Geometric mean area |
| (D) | None of the above |

73. For heat flow through very thick walled cylinder, use

|  |  |
| --- | --- |
| (A) | arithmetic mean radius |
| (B) | logarithmic mean radius |
| (C) | geometric mean radius |
| (D) | either (A) or (C) |

74. What is the logarithmic mean of rland r2?

|  |  |
| --- | --- |
| (A) | [(r1 – r2) / ln(r1/r2)] |
| (B) | [(r1 – r2) / ln(r2/r1)] |
| (C) | [(r2 – r1) / ln(r1/ r2] |
| (D) | [(r1 – r2) / –ln(r1/r2)] |

75. What is Nusselt number?

|  |  |
| --- | --- |
| (A) | Cp.μ / k |
| (B) | hD / k |
| (C) | h.Cp / μ |
| (D) | Cp.μ / h |

76. Prandtl number is

|  |  |
| --- | --- |
| (A) | Cp.μ / k |
| (B) | hD / k |
| (C) | Cp.μ / A |
| (D) | μ / h.Cp |

77. Thermal diffusivity is

|  |  |
| --- | --- |
| (A) | k / ρ.Cp |
| (B) | ρ.Cp /k |
| (C) | Cp.μ / a |
| (D) | μ / hCp |

78. Grashhoff number is

|  |  |
| --- | --- |
| (A) | gD3.β.Δtρ2/ μ2 |
| (B) | gD2βΔtρ/ μ2 |
| (C) | gD2βΔtρ2μ |
| (D) | gD3βΔtρ2/ μ |

79. If h1 = inner film co-efficient and h2= outer film co-efficient, then the overall heat transfer co-efficient is

|  |  |
| --- | --- |
| (A) | always less, than h1 |
| (B) | always between h1 and h2 |
| (C) | always higher than h2 |
| (D) | dependent on metal resistance |

80. Graetz number is

|  |  |
| --- | --- |
| (A) | mCp /kl |
| (B) | kL / mCp |
| (C) | mCp / k μ |
| (D) | kL / mCp |

81. Rate of a chemical reaction is independent of the concentration of reactants for reaction.

|  |  |
| --- | --- |
| (A) | zero order |
| (B) | third order |
| (C) | consecutive |
| (D) | None of the above |

82. Which of the following is not a unit of reaction rate?

|  |  |
| --- | --- |
| (A) | moles formed/(surface of catalyst) (time) |
| (B) | moles formed/(volume of reactor) (time) |
| (C) | mole formed/(volume of catalyst) (time) |
| (D) | None of the above |

83. Which of the following is a controlling factor in very fast heterogeneous reaction?

|  |  |
| --- | --- |
| (A) | Heat and mass transfer effects |
| (B) | Pressure |
| (C) | Temperature |
| (D) | Composition of reactant |

84. Variables affecting the rate of homogeneous reactions are

|  |  |
| --- | --- |
| (A) | pressure and temperature only |
| (B) | temperature and composition only |
| (C) | pressure and composition only |
| (D) | pressure, temperature and composition |

85. Rate determining step in a reaction consisting of a number of steps in series is the

|  |  |
| --- | --- |
| (A) | fastest step |
| (B) | slowest step |
| (C) | intermediate step |
| (D) | data insufficient; can't be predicted |

86. Chemical kinetics can predict the

|  |  |
| --- | --- |
| (A) | rate of reaction |
| (B) | feasibility of reaction |
| (C) | Both (A) and (B) |
| (D) | None of the above |

87. Velocity of a chemical reaction

|  |  |
| --- | --- |
| (A) | decreases with increase in temperature |
| (B) | increases with increase of pressure of reactants for all reactions |
| (C) | decreases with increase of reactant concentration |
| (D) | None of the above |

88. Sum of the powers of the concentration terms in the rate equation is called the ……………….. of the reaction.

|  |  |
| --- | --- |
| (A) | order |
| (B) | overall order |
| (C) | molecularity |
| (D) | None of the above |

89. Molecularity of a reaction

|  |  |
| --- | --- |
| (A) | is always equal to the overall order of reaction |
| (B) | may not be equal to the order of reaction |
| (C) | can't have a fractional value |
| (D) | Both (B) and (C) |

90. Inversion of cane sugar is an example of

|  |  |
| --- | --- |
| (A) | unimolecular reaction with first order |
| (B) | bimolecular reaction with second order |
| (C) | bimolecular reaction with first order |
| (D) | unimolecular reaction with second order |

91. Concentration of the limiting reactant (with initial concentra­tion of a moles/litre) after time *t* is (*a – x*). Then t for a first order reaction is given by

|  |  |
| --- | --- |
| (A) | *k.t* = ln (*a* / (*a – x*)) |
| (B) | *k.t* = *x* / [*a*(*a – x*)] |
| (C) | *k.t* = ln [(*a* – *x*) / *a*] |
| (D) | *k.t* = [(*a*(*a* – *x*) / *x*] |

92. Half life period of a chemical reaction is

|  |  |
| --- | --- |
| (A) | the time required to reduce the concentration of the react­ing substance to half its initial value |
| (B) | half of the space time of a reaction |
| (C) | half of the residence time of a reaction |
| (D) | None of the above |

93. Half-life period for a first order reaction is …………… the initial concentration of the reactant.

|  |  |
| --- | --- |
| (A) | directly proportional to |
| (B) | inversely proportional to |
| (C) | independent of |
| (D) | None of the above |

94. The reaction in which rate equation corresponds to a stoichiometric equation is called

|  |  |
| --- | --- |
| (A) | elementary reaction |
| (B) | non-elementary reaction |
| (C) | parallel reaction |
| (D) | autokinetic reaction |

95. Equilibrium of a chemical reaction as viewed by kinetics is a

|  |  |
| --- | --- |
| (A) | dynamic steady state |
| (B) | static steady state |
| (C) | dynamic unsteady state |
| (D) | None of the above |

96. For a zero order reaction, concentration of product increases with

|  |  |
| --- | --- |
| (A) | increase of reaction time |
| (B) | increase in initial concentration |
| (C) | total pressure |
| (D) | decrease in total pressure |

97. Arrhenius equation shows the variation of …………… with tempera­ture.

|  |  |
| --- | --- |
| (A) | reaction rate |
| (B) | rate constant |
| (C) | energy of activation |
| (D) | frequency factor |

98. A fluid is one which

|  |  |
| --- | --- |
| (A) | cannot remain at rest under the action of shear force |
| (B) | continuously expands till it fills any container |
| (C) | is incompressible |
| (D) | permanently resists distortion |

99. In an incompressible fluid, density

|  |  |
| --- | --- |
| (A) | is greatly affected by moderate changes in pressure |
| (B) | is greatly affected only by moderate changes in tempera­ture |
| (C) | remains unaffected with moderate change in temperature ­and pressure |
| (D) | is sensible to changes in both temperature and pressure |

100. Potential flow is the flow of

|  |  |
| --- | --- |
| (A) | compressible fluids with shear |
| (B) | compressible fluids with no shear |
| (C) | incompressible fluids with shear |
| (D) | incompressible fluids with no shear |

101. Potential flow is characterised by

|  |  |
| --- | --- |
| (A) | irrotational and frictionless flow ­ |
| (B) | irrotational and frictional flow |
| (C) | one in which dissipation of mechanical energy into heat occurs |
| (D) | the formation of eddies within the stream |

102. Newton's law of viscosity relates

|  |  |
| --- | --- |
| (A) | shear stress and velocity |
| (B) | velocity gradient and pressure intensity |
| (C) | shear stress and rate of angular deformation in a fluid |
| (D) | pressure gradient and rate of angular deformation |

103. Dimension of viscosity is

|  |  |
| --- | --- |
| (A) | ML–1T–1 |
| (B) | MLT –1 |
| (C) | ML–1T |
| (D) | MLT |

104. Poise is converted into stoke by

|  |  |
| --- | --- |
| (A) | multiplying with density (gm/c.c.) |
| (B) | dividing by density (gm/c.c.) ­ |
| (C) | multiplying with specific gravity |
| (D) | dividing by specific gravity |

105. Dimension of kinematic viscosity is

|  |  |
| --- | --- |
| (A) | MLT–1 |
| (B) | L2 . T–1 |
| (C) | L2.T |
| (D) | L2 .T–2 |

106. With increase in the temperature, viscosity of a liquid

|  |  |
| --- | --- |
| (A) | increases |
| (B) | decreases |
| (C) | remains constant |
| (D) | may increase or decreases depends on the liquid |

107. For water, when the pressure increases, the viscosity

|  |  |
| --- | --- |
| (A) | also increases |
| (B) | decreases |
| (C) | remains constant |
| (D) | first decreases and then increases |

108. The pressure intensity is the same in all directions at a point in a fluid

|  |  |
| --- | --- |
| (A) | only when the fluid is frictionless |
| (B) | only when the fluid is at rest having zero velocity |
| (C) | when there is no motion of one fluid layer relative to an adjacent layer |
| (D) | regardless of the motion of one fluid layer relative to an adjacent layer |

109. Choose the set of pressure intensities that are equivalent

|  |  |
| --- | --- |
| (A) | 4.33 psi, 10 ft. of water, 8.83 inches of Hg |
| (B) | 4.33 psi, 10 ft. of water, 20.7 inches of Hg |
| (C) | 10 psi, 19.7 ft. of water, 23.3 inches of Hg |
| (D) | 10 psi, 19.7 ft. of water, 5.3 inches of Hg |

110. For a fluid rotating at constant angular velocity about vertical axis as a rigid body, the pressure intensity varies as the

|  |  |
| --- | --- |
| (A) | square of the radial distance |
| (B) | radial distance linearly |
| (C) | inverse of the radial distance |
| (D) | elevation along vertical direction |

111. The centre of pressure is

|  |  |
| --- | --- |
| (A) | always below the centroid of the area |
| (B) | always above the centroid of the area |
| (C) | a point on the line of action of the resultant force |
| (D) | at the centroid of the submerged area |

112. Mass velocity is independent of temperature and pressure when the flow is

|  |  |
| --- | --- |
| (A) | unsteady through unchanged cross-section |
| (B) | steady through changing cross-section |
| (C) | steady and the cross-section is unchanged |
| (D) | unsteady and the cross-section is changed |

113. In turbulent flow

|  |  |
| --- | --- |
| (A) | the fluid particles move in an orderly manner |
| (B) | momentum transfer is on molecular scale only |
| (C) | shear stress is caused more effectively by cohesion than momentum transfer |
| (D) | shear stresses are generally larger than in a similar laminar flow |

114. An ideal fluid is

|  |  |
| --- | --- |
| (A) | frictionless and incompressible |
| (B) | one which obeys Newton's law of viscosity |
| (C) | highly viscous |
| (D) | None of the above |

115. Shape factor for a cylinder whose length equals its diameter is

|  |  |
| --- | --- |
| (A) | 1.5 |
| (B) | 0.5 |
| (C) | 1 |
| (D) | None of the above |

116. The ratio of the actual mesh dimension of Taylor series to that of the next smaller screen is

|  |  |
| --- | --- |
| (A) | 2 |
| (B) |  |
| (C) | 1 |
| (D) | None of the above |

117. The opening of 200 mesh screen (Taylor series) is

|  |  |
| --- | --- |
| (A) | 0.0074 cm |
| (B) | 0.0074 mm |
| (C) | 0.0047 cm |
| (D) | None of the above |

118. The ratio of the area of openings in one screen (Taylor series)to that of the openings in the next smaller screen is

|  |  |
| --- | --- |
| (A) | 1.5 |
| (B) | 1 |
| (C) |  |
| (D) | None of the above |

119. Cumulative analysis for determining surface is more precise than differential analysis because of the

|  |  |
| --- | --- |
| (A) | assumption that all particles in single fraction are equal in size |
| (B) | fact that screening is more effective |
| (C) | assumption that all particles in a single fraction are equal in size, is not needed |
| (D) | None of the above |

120. For coarse reduction of hard solids, use

|  |  |
| --- | --- |
| (A) | impact |
| (B) | attrition |
| (C) | compression |
| (D) | cutting |

121. Soft and non-abrasive materials can be made into fines by

|  |  |
| --- | --- |
| (A) | attrition |
| (B) | compression |
| (C) | cutting |
| (D) | None of the above |

122. Crushing efficiency is the ratio of

|  |  |
| --- | --- |
| (A) | surface energy created by the crushing to the energy ab­sorbed by the solid |
| (B) | the energy absorbed by the solid to that fed to the machine |
| (C) | the energy fed to the machine to the surface energy created by the crushing |
| (D) | the energy absorbed by the solid to the surface energy created by the crushing |

123. Rittinger's crushing law states that

|  |  |
| --- | --- |
| (A) | work required to form a particle of any size is proportional to the square of the surface to volume ratio of the product |
| (B) | work required to form a particle. of a particular size is proportional to the square root of the surface to volume ratio of the product |
| (C) | work required in crushing is proportional to the new sur­face created |
| (D) | for a given machine and feed, crushing efficiency is depend­ent on the size of feed and product |

124. Bond crushing law

|  |  |
| --- | --- |
| (A) | calls for relatively less energy for the smaller product particles than does the Rittinger law |
| (B) | is less realistic in estimating the power requirements of commercial crushers |
| (C) | states that the work required to form particle of any sizefrom very large feed is proportional to the square root of the volume to surface ratio of the product |
| (D) | states that the work required for the crushing is propor­tional to the new surface created |

125. Work index is defined as the

|  |  |
| --- | --- |
| (A) | Gross energy (kWh/ton of feed) needed to reduce very large feed to such a size that 80% of the product passes a 100 micron screen |
| (B) | energy needed to crush one tonne of feed to 200 microns |
| (C) | energy (kWh/ton of feed) needed to crush small feed to such a size that 80% of the product passes a 200 mesh screen |
| (D) | energy needed to crush one ton of feed to 100 microns |

126. The operating speed of a ball mill should be ……………… the critical speed.

|  |  |
| --- | --- |
| (A) | less than |
| (B) | much more than |
| (C) | at least equal to |
| (D) | None of the above |

127. A fluid energy mill is used for

|  |  |
| --- | --- |
| (A) | cutting |
| (B) | grindling |
| (C) | ultragrinding |
| (D) | crushing |

128. Wet grinding in a revolving mill

|  |  |
| --- | --- |
| (A) | gives less wear on chamber walls than dry grinding |
| (B) | requires more energy than for dry grinding |
| (C) | increases capacity compared to dry grinding |
| (D) | complicates handling of the product compared to dry grind­ing |

129. Cement clinker is reduced to fine size by

|  |  |
| --- | --- |
| (A) | Roll crusher |
| (B) | Ball mill |
| (C) | Tube mill |
| (D) | Hammer mill |

130. Mixer used for rubber compounding is

|  |  |
| --- | --- |
| (A) | Mixer-extruders |
| (B) | Banbury internal mixer |
| (C) | Muller mixer |
| (D) | None of the above |

131. Molten ammonium nitrate is mixed with ground lime-stone in fertilizer plant in a

|  |  |
| --- | --- |
| (A) | Pug mill |
| (B) | Mixer-extruder |
| (C) | Banbury mixer |
| (D) | Muller mixer |

132. For the preliminary breaking of hard rock, we use

|  |  |
| --- | --- |
| (A) | gyratory crusher |
| (B) | ball mill |
| (C) | tube mill |
| (D) | squirrel-cage disintegrator |

133. Fibrous material is broken by

|  |  |
| --- | --- |
| (A) | Roll crusher |
| (B) | Squirrel-cage disintegrator |
| (C) | Ball mil |
| (D) | None of the above |

134. Pick out the first order system from among the following.

|  |  |
| --- | --- |
| (A) | damped vibrator |
| (B) | mercury in glass thermometer kept in boiling water |
| (C) | interacting system of two tanks in series |
| (D) | non-interacting system of two tanks in series |

135. Response of a system to a sinusoidal input is called

|  |  |
| --- | --- |
| (A) | impulse response |
| (B) | unit step response |
| (C) | frequency response |
| (D) | None of the above |

136. Time constant is

|  |  |
| --- | --- |
| (A) | the time taken by the controlled variable to reach 63.2% of its full change |
| (B) | same as transportation lag |
| (C) | same as dead time |
| (D) | the time required by the measured variable to reach 63.2% of its ultimate change |

137. Dead zone is

|  |  |
| --- | --- |
| (A) | same as time constant |
| (B) | same as transportation lag |
| (C) | the maximum change in the variable that does not change the reading of the instrument |
| (D) | None of the above |

138. For measuring the temperature of a red hot furnace, which is the most suitable instrument?

|  |  |
| --- | --- |
| (A) | Platinum resistance thermometer |
| (B) | Thermocouple |
| (C) | Optical pyrometer |
| (D) | Bimetallic thermometer |

139. Pick out the most suitable instrument for measuring tempera­ture in the range of –40 to 425°C.

|  |  |
| --- | --- |
| (A) | mercury thermometer |
| (B) | bimetallic thermometer |
| (C) | radiation pyrometer |
| (D) | None of the above |

140. Thermocouple is suitable for measuring

|  |  |
| --- | --- |
| (A) | liquid temperatures only |
| (B) | very high temperatures only |
| (C) | very low temperatures only |
| (D) | both high and low temperatures |

141. Psychrometer determines

|  |  |
| --- | --- |
| (A) | humidity of gases |
| (B) | moisture content of solids |
| (C) | water of crystallisation |
| (D) | hygroscopic nature of solids |

142. Continuous measurement of moisture content of paper in paper industry is done by measuring

|  |  |
| --- | --- |
| (A) | thermal conductivity through the paper |
| (B) | electrical resistance through the paper |
| (C) | magnetic susceptibility |
| (D) | None of the above |

143. Optical activity of a solution can be determined using a

|  |  |
| --- | --- |
| (A) | polarimeter |
| (B) | polarograph |
| (C) | dilatometer |
| (D) | refractrometer |

144. Pirani gauge is used for

|  |  |
| --- | --- |
| (A) | measurement of very high pressure |
| (B) | measurement of high vacuum |
| (C) | liquid level under pressure |
| (D) | liquid level at atmospheric pressure |

145. A barometer measures …………… pressure.

|  |  |
| --- | --- |
| (A) | absolute |
| (B) | gauge |
| (C) | both absolute and gauge |
| (D) | dynamic |

146. Continuous measurement of specific gravity of a liquid is done by

|  |  |
| --- | --- |
| (A) | hydrometer |
| (B) | contact-type electric indicators |
| (C) | displacement meter |
| (D) | Both (A) and (C) |

147. Which of the following is a thermodynamic property of a system?

|  |  |
| --- | --- |
| (A) | Concentration |
| (B) | Mass |
| (C) | Temperature |
| (D) | Entropy |

148. First law of thermodynamics is mathematically stated as

|  |  |
| --- | --- |
| (A) | dQ = dE + dW |
| (B) | dQ = dE – dW |
| (C) | dE = dQ + dW |
| (D) | dW = dQ + De |

149. Efficiency of a heat engine working on Carnot cycle between two temperature levels depends upon

|  |  |
| --- | --- |
| (A) | the two temperatures only |
| (B) | the pressure of working fluid |
| (C) | the mass of the working fluid |
| (D) | both mass and pressure of the working fluid |

150. Efficiency of a Carnot engine working between temperatures Tland T2(Tl < T2)is

|  |  |
| --- | --- |
| (A) | [(T2  – T1) /T2 ] |
| (B) | [(T2  – T1) /T1 ] |
| (C) | [(T1  – T2) /T2 ] |
| (D) | [(T1  – T2) /T1 ] |

