

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) Amagat'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, $\text{PCl}_5 \leftrightarrow \text{PCl}_3 + \text{Cl}_2$, 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, $\log_{10} P = A - B/(t + c)$. 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) V_2O_5 and Cr_2O_3
 - (B) Oxides of nitrogen and Cr_2O_3
 - (C) V_2O_5 on a porous carrier and oxides of nitrogen
 - (D) Oxides of Nitrogen and V_2O_5 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) SO_2 and 80 Kg of H_2SO_4
 - (B) H_2SO_4 and 80 Kg of SO_3
 - (C) SO_3 for each 100 Kg of H_2SO_4
 - (D) None of the above
21. Producer gas consists mainly of
- (A) CO , CO_2 , N_2 , H_2
 - (B) CO , H_2
 - (C) H_2 , CH_4
 - (D) C_2H_2 , CO_2 , H_2
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 'Solvarny 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 , SiO_2 , Al_2O_3
 - (B) MgO , SiO_2 , K_2O
 - (C) Al_2O_3 , MgO , Fe_2O_3
 - (D) CaO , MgO , K_2O
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) cm^2/sec
 - (B) cm/sec
 - (C) cm^3/sec
 - (D) cm^2/sec^2
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) $\text{Flux} = \text{Co-efficient}/\text{concentration difference}$
 - (B) $\text{Co-efficient} = \text{Flux}/\text{concentration difference}$
 - (C) $\text{Flux} = \text{concentration difference}/\text{co-efficient}$
 - (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 liquidthat 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) $\text{kcal/hr. m}^2 \text{ } ^\circ\text{C}$
 - (B) $\text{kcal/hr.m.}^\circ\text{C}$
 - (C) kcal/hr.m
 - (D) $\text{kcal/hr. } ^\circ\text{C}$

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 r_1 and r_2 ?

- (A) $[(r_1 - r_2) / \ln(r_1/r_2)]$
- (B) $[(r_1 - r_2) / \ln(r_2/r_1)]$
- (C) $[(r_2 - r_1) / \ln(r_1/r_2)]$
- (D) $[(r_1 - r_2) / -\ln(r_1/r_2)]$

75. What is Nusselt number?

- (A) $C_p \cdot \mu / k$
- (B) hD / k
- (C) $h \cdot C_p / \mu$
- (D) $C_p \cdot \mu / h$

76. Prandtl number is

- (A) $C_p \cdot \mu / k$
- (B) hD / k
- (C) $C_p \cdot \mu / A$
- (D) $\mu / h \cdot C_p$

77. Thermal diffusivity is

- (A) $k / \rho \cdot C_p$
- (B) $\rho \cdot C_p / k$
- (C) $C_p \cdot \mu / a$
- (D) μ / hC_p

78. Grashhoff number is
- (A) $gD^3 \cdot \beta \cdot \Delta t \rho^2 / \mu^2$
 - (B) $gD^2 \beta \Delta t \rho / \mu^2$
 - (C) $gD^2 \beta \Delta t \rho^2 \mu$
 - (D) $gD^3 \beta \Delta t \rho^2 / \mu$
79. If h_1 = inner film co-efficient and h_2 = outer film co-efficient, then the overall heat transfer co-efficient is
- (A) always less, than h_1
 - (B) always between h_1 and h_2
 - (C) always higher than h_2
 - (D) dependent on metal resistance
80. Graetz number is
- (A) mC_p / kL
 - (B) kL / mC_p
 - (C) $mC_p / k \mu$
 - (D) kL / mC_p
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) $ML^{-1}T^{-1}$
 - (B) MLT^{-1}
 - (C) $ML^{-1}T$
 - (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) $L^2 \cdot T^{-1}$
 - (C) $L^2 \cdot T$
 - (D) $L^2 \cdot T^{-2}$
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) $\sqrt{2}$
 - (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) $\sqrt{2}$
 - (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 size from 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 mill
 - (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 T_1 and T_2 ($T_1 < T_2$) is

- (A) $[(T_2 - T_1) / T_2]$
- (B) $[(T_2 - T_1) / T_1]$
- (C) $[(T_1 - T_2) / T_2]$
- (D) $[(T_1 - T_2) / T_1]$

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ANSWER KEY**Subject Name: 603 CHEMICAL ENGINEERING**

SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	B	31	B	61	D	91	A	121	A
2	C	32	B	62	C	92	A	122	A
3	A	33	B	63	C	93	C	123	C
4	A	34	A	64	B	94	A	124	A
5	B	35	B	65	B	95	A	125	A
6	C	36	A	66	A	96	A	126	A
7	A	37	B	67	B	97	B	127	C
8	C	38	B	68	A	98	A	128	C
9	B	39	C	69	C	99	C	129	C
10	B	40	A	70	D	100	D	130	B
11	A	41	D	71	D	101	A	131	A
12	C	42	A	72	A	102	C	132	A
13	D	43	B	73	B	103	A	133	B
14	A	44	B	74	A	104	B	134	B
15	B	45	A	75	B	105	B	135	C
16	B	46	C	76	A	106	B	136	A
17	B	47	B	77	A	107	D	137	C
18	D	48	D	78	A	108	C	138	C
19	A	49	C	79	B	109	A	139	B
20	A	50	B	80	A	110	A	140	D
21	A	51	B	81	A	111	C	141	A
22	C	52	B	82	D	112	C	142	B
23	B	53	C	83	A	113	D	143	A
24	C	54	A	84	D	114	A	144	B
25	D	55	C	85	B	115	A	145	A
26	A	56	A	86	A	116	B	146	D
27	D	57	A	87	D	117	A	147	D
28	D	58	B	88	B	118	D	148	A
29	C	59	D	89	D	119	C	149	A
30	C	60	B	90	C	120	C	150	A