1. According to IPC the "THEF" means

(A) Honest
(B) Dishonest
(C) Take any movable property with dishonest
(D) All the above
(E) Answer not known

2. Language of Court shall be

(A) Court order
(B) Court within the state
(C) Other than High Court
(D) All the above
(E) Answer not known

3. Moral Communications

(A) Proficiency
(B) Clarifying
(C) Consistent
(D) To express moral views to others
(E) Answer not known

4. Corporate Ethics obeys only to

(A) Law of Corporate
(B) Ethics
(C) Legalistic Strategies
(D) Indian Law
(E) Answer not known

5. The ethics make the engineers realize the importance of tolerance among them, in case of disagreement while applying

(A) Skills
(B) Knowledge
(C) Self regulation
(D) Moral autonomy
(E) Answer not known

6. The main characteristics of engineer as managers are

(A) Promote an ethical climate
(B) Not resolving conflicts
(C) No social responsibility
(D) No interest in producing valuable products
(E) Answer not known

7. Acceptable Risk

(A) Risk are Job-Oriented
(B) Risk are not Job-Oriented
(C) Risk are non-acceptable
(D) None of the above
(E) Answer not known

8. Employee Right can be viewed by

(A) Criticism
(B) Privacy
(C) Respect
(D) Work
(E) Answer not known

9. This type of authority the corporate or institutional right given to a person to exercise power based on the resources of an organization.

(A) Executive Authority
(B) Power
(C) Colleagues
(D) Support
(E) Answer not known

10. Conflicting Interest means

(A) When a person has two or more desire that can't be satisfied
(B) When a person has desire to satisfied
(C) When a person not have desire to satisfied
(D) None of the above
(E) Answer not known

11. Important codes of Ethics are

(A) Offering Inspiration
(B) Providing Guidance
(C) Protecting the Public
(D) All of the above
(E) Answer not known

12. Risk means

(A) Harmful may occur
(B) Magnitude
(C) Benefits
(D) Safely Escape
(E) Answer not known

13. Who developed virtue ethics?

(A) Jeremy Bentham
(B) Immanual Kant
(C) Aristotle
(D) John Stuart Mill
(E) Answer not known

14. What is Business Ethics?

(A) The study of business situations, activities and decisions where issues of right and wrong are addressed

(B) Defined as decision organisations make on issues that could be considered right or wrong

(C) Ethics that can be applied to an organisations practices

(D) Ethical processor, business situations, activities and decisions where issues of right and wrong are addressed

(E) Answer not known

15. Which of the following is a conflict simulation technique?

(A) Expansion of resources

(B) Compromise

(C) Bringing in outsiders

(D) Authoritative Command

(E) Answer not known

16. What element did Gilligan consider in her theory of moral development after it was not fully addressed by Kohlberg?

(A) IQ differences

(B) Religious preferences

(C) Gender differences

(D) Geographic location

(E) Answer not known

17. Which of the following is not an Ethical Principle of a Private relationship?

(A) Loyalty

(B) Openness

(C) Truthfulness

(D) Responsibility

(E) Answer not known

18. The rules of ethics are also called as

(A) Rules
(B) Law
(C) Responsibility
(D) Values
(E) Answer not known

19. Which of the virtue mentions that industry and society are an interactive system?

(A) Ethics
(B) Moral
(C) Work Ethics
(D) Values
(E) Answer not known

20. The ability to understand and share the feelings of another is called as _____.

(A) Empathy
(B) Sympathy
(C) Both (A) and (B)
(D) None of the above
(E) Answer not known

21. Find the inverse of $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$

(A) $\frac{1}{8}\begin{bmatrix} -24 & -8 & -12 \\ 10 & 2 & 6 \\ 2 & 2 & 2 \end{bmatrix}$
(B) $\begin{bmatrix} -24 & -8 & -12 \\ 10 & 2 & 6 \\ 2 & 2 & 2 \end{bmatrix}$
(C) $\frac{1}{8}$
(D) $\begin{bmatrix} 3 & 1 & 1 \\ -3 & 3 & 1 \\ 4 & 4 & -2 \end{bmatrix}$
(E) Answer not known

22. If $A^2 = A$, then the matrix A is called

(A) Idempotent matrix
(B) Multiplication matrix
(C) Addition matrix
(D) Square matrix
(E) Answer not known

23. If all the elements of a matrix are zero, it is called a _____.

(A) Null matrix
(B) Equal matrix
(C) Zero matrix
(D) Both (A) and (C)
(E) Answer not known

24. _____ is the technique of estimating the value of a function for any intermediate value of the independent variable.

(A) Interpolation
(B) Elemental analysis
(C) Integration
(D) Method of analysis
(E) Answer not known

25. The Eigen Values of the characteristic Polynomial $\lambda^6 - 4\lambda^5 - 12\lambda^4$ of a 6×6 Matrix are

(A) 1, 1, 1, 1, 6, –2
(B) 0, 0, 0, 0, 6, –2
(C) 1, 1, 0, 0, 6, –2
(D) 1, 0, –1, –6, 2
(E) Answer not known

26. If two Eigen values of $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ are 3 and 15, then the third Eigen value is

(A) 0 (B) 1

(C) –1 (D) 2

(E) Answer not known

27. The integrating factor for the differential equation $\cos^2 x \cdot \frac{dy}{dx} + y = \tan x$ is _____.

(A) $e^{\tan x}$ (B) $\cos 2x$

(C) $e^{-\tan x}$ (D) $\sin 2x$

(E) Answer not known

28. The Eigen vector corresponding to the Eigen value $\lambda = 7$ for the matrix $A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$ is

(A) $\begin{bmatrix} 1 \\ -1 \end{bmatrix}$ (B) $\begin{bmatrix} -1 \\ 2 \end{bmatrix}$

(C) $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$

(E) Answer not known

29. Newton-Raphson iterative formula to find $\sqrt[K]{N}$ is

(A) $x_{n+1} = x_n[2 - Nx_n]$

(B) $x_{n+1} = \frac{1}{2}\left[x_n + \frac{N}{x_n}\right]$

(C) $x_{n+1} = \frac{1}{2}\left[x_n + \frac{1}{Nx_n}\right]$

(D) $x_{n+1} = \frac{1}{K}\left[(K-1)x_n + \frac{N}{x_n^{K-1}}\right]$

(E) Answer not known

30. _____ method consists in diminution of the root of an equation by successive digits occurring in the roots.

(A) Bisection
(B) False Position
(C) Horner's
(D) Linear
(E) Answer not known

31. Modified form of Gauss elimination method is

(A) Gauss Section method
(B) Sider-Date method
(C) Gauss-Jordan method
(D) Newton-Raphson
(E) Answer not known

32. _____ method consists in locating the root of the equation $f(x) = 0$ between *'a'* and *'b'*.

(A) Linear
(B) Bisection
(C) Non-linear
(D) False position
(E) Answer not known

33. Which one of the following is one dimensional heat flow equation?

(A) $C^2 = \frac{\partial u}{\partial t} . \frac{\partial^2 u}{\partial x^2}$

(B) $\frac{\partial^2 u}{\partial x^2} = C^2 . \frac{\partial u}{\partial t}$

(C) $\frac{\partial u}{\partial t} = C^2 . \frac{\partial^2 u}{\partial x^2}$

(D) $\frac{\partial^2 u}{\partial x^2} = C . \frac{\partial u}{\partial t}$

(E) Answer not known

34. When n is a multiple of 3,

$$\int_{x_0}^{x_0+nh} f(x)dx = \frac{3h}{8}$$

$$[(y_0 + y_n) + 3(y_1 + y_2 + y_4 + y_5 + ... + y_{n-1}) + 2(y_3 + y_6 + y_{n-3})]$$

is known as

(A) Trapezoidal rule

(B) Simpson's three-eighth rule

(C) Newton-Cote's quadrature formula

(D) Simpson's one-third rule

(E) Answer not known

35. Evaluate $\Delta \tan^{-1} x$

(A) $\tan^{-1}\left[\frac{h}{1 + hx + x^2}\right]$

(B) $\tan^{-1}\left[\frac{h}{x + hx^2 + x^3}\right]$

(C) $\tan^{-1}\left[\frac{h^2}{1 + hx + x^2}\right]$

(D) $\tan^{-1}\left[\frac{2h}{1 + hx + x^2}\right]$

(E) Answer not known

36. A function $f(x, y)$ is said to be continuous at the point *(a, b)* if $Lt\, f(x, y)$ exists and equal to

$x \to a$

$y \to b$

(A) $f(a - b)$ (B) $f(a + b)$

(C) $f(a, b)$ (D) $f(a^2, b^2)$

(E) Answer not known

37. The Eigen values of an idempotent matrix are

(A) Either zero or unity (B) Either zero or ∞

(C) Either 1 or ∞ (D) Either –1 or +1

(E) Answer not known

38. A real matrix A is orthogonal if

(A) $A = A^{-1}$ (B) $A = A^T$

(C) $A^2 = A^{-1}$ (D) $A^{-1} = A^T$

(E) Answer not known

39. An orthogonal set of vectors are always _____.

(A) linearly symmetric (B) linearly non-symmetric

(C) linearly dependent (D) linearly independent

(E) Answer not known

40. The product of the Eigen values of a matrix A is equal to _____.

(A) 0 (B) 1

(C) $|A|$ (D) A^{-1}

(E) Answer not known

41. The basis of reverse osmosis is _____.

(A) Osmotic Pressure is greater than the hydrostatic pressure

(B) Osmotic pressure is equal to the hydrostatic pressure

(C) Hydrostatic pressure is greater than the osmotic pressure

(D) Osmotic pressure does not exist

(E) Answer not known

42. A membrane reactor is a device that utilize the properties of a membrane to improve the efficiency of _____ reactions.

(A) Physical (B) Chemical

(C) Steady State (D) Adiabatic

(E) Answer not known

43. In Pervaporation units are commonly used modules are,

(i) Flat sheet and Spiral wound modules.

(ii) Rough sheet and Spiral wound modules.

(iii) Round sheet and Spiral wound modules.

(A) Only (i) (B) Only (ii)

(C) Only (ii) and (iii) (D) Only (i) and (iii)

(E) Answer not known

44. The diffusivity D is the property of the system, dependent upon

(i) Temperature

(ii) Pressure

(iii) Nature of the components

(A) Only (i)
(B) Only (ii)
(C) Only (i), (ii) and (iii)
(D) Only (i) and (ii)
(E) Answer not known

45. Ceramic Membranes have an advantage over polymer membranes on the following

(A) Chemically inert and stable at high pressure
(B) Chemically inert and stable at high temperature
(C) Highly reactive with temperature
(D) Highly reactive with pressure
(E) Answer not known

46. With asymmetric membranes or dense polymer membranes, permeation of liquids occurs by a solution

(A) Distillation mechanism
(B) Extraction process
(C) Dialysis process
(D) Diffusion mechanism
(E) Answer not known

47. In distillation column, minimum number of plates required for a given separation may be found by constructing steps on an *XY* diagram between compositions x_D and x_B.

(A) Using the 45° line as the operating line for both section of the column.

(B) Using the 30° line as the operating line.

(C) Using the 60° line as the operating line.

(D) Using the 15° line as the operating line.

(E) Answer not known

48. An electromotive force is applied across the membrane to assist in the diffusion of charged particles, the operation is,

(A) Reverse osmosis

(B) Electrodialysis

(C) Ion Exchange process

(D) Dialysis process

(E) Answer not known

49. In distillation where q is defined as the moles of liquid flow in the stripping section per mole of feed introduced, for saturated liquid feed,

(A) $q > 1$

(B) $q < 1$

(C) $q = 1$

(D) $q = 0$

(E) Answer not known

50. _____ is a separation process in which one or more components of a liquid mixture diffuse through a selective membrane, evaporate under low pressure on the down stream side and removed by a vacuum pump.

(A) Dialysis
(B) Pervaporation
(C) Reverse osmosis
(D) Osmosis
(E) Answer not known

51. Drying of gases is often carried out by _____ the water on silica gel, alumina or other inorganic porous solids.

(A) Absorbing
(B) Adsorbing
(C) Desorbing
(D) Drying
(E) Answer not known

52. In the fractional distillation, the feed is introduced centrally, the vapour raising in the section above the feed is called

(A) Rectifying section
(B) Stripping section
(C) Reboiler section
(D) Condenser section
(E) Answer not known

53. In the reverse osmosis process, de-mineralization water is produced by forcing water at high pressure, through

(A) Semi permeable membrane
(B) Permeable membrane
(C) Filters
(D) Membrane filters
(E) Answer not known

54. The exhausted cation exchanger column is regenerated by passing a solution of

(A) Diluted HCl
(B) Diluted NaCl
(C) Concentrated HCl
(D) Concentrated NaCl
(E) Answer not known

55. In Dialysis process, the driving force is

(A) Temperature
(B) Inertia force
(C) Chemical potential
(D) Pressure
(E) Answer not known

56. The operation of Ion Exchangers, the feed solution is normally passed downward through the bed at a flow rate of

(A) 1 to 5 gal/min.ft^2 (1 gpm/ft^2 = 0.67 ft/min)
(B) 0.5 to 1 gal/min.ft^2
(C) 1 to 2 gal/min.ft^2
(D) 2 to 5 gal/min.ft^2
(E) Answer not known

57. The absorption of a very soluble gas, the mole fraction in the liquid at the interface would be _____ that in the gas.

(A) Greater than
(B) Less than
(C) Equal to
(D) Not equal to
(E) Answer not known

58. Absorption followed by it reaction in the liquid phase is often used to get more complete removal of a

(A) Solute from a gas mixture
(B) Solvent mixture
(C) Saturated gas
(D) Unsaturated gas mixture
(E) Answer not known

59. When pore size is much smaller than the normal mean free path, the diffusion process is called

(A) Knudsen diffusion
(B) Eddy diffusion
(C) Molecule diffusion
(D) Molar diffusion
(E) Answer not known

60. The diffusion coefficient for dilute solutions of completely ionized univalent electrolytes is given by

(A) Wilke-Chang equation
(B) Chapman-Enskog equation
(C) Nernst equation
(D) Lennard Jones potential
(E) Answer not known

61. The bubbling fluidized bed reactor requires _____ to achieve a given conversion.

(A) More catalyst than a fixed bed reactor
(B) Less catalyst then a fixed bed reactor
(C) Equal amount of catalyst as that of fixed bed reactor
(D) No catalyst
(E) Answer not known

62. Darcy-Weisbach formula is given as h_f =

(A) $4f^2LV/D\times 2g$ (B) $4fL^2V/D\times 2g$

(C) $4fLV^2/D\times 2g$ (D) $4fL^2V^2/D\times 2g$

(E) Answer not known

63. Hagen-Poiseuille equation predicts volumetric flow rate to be proportional to _____ for laminar flow in pipe.

(A) R (B) R^2

(C) R^4 (D) $R^{0.5}$

(E) Answer not known

64. Pascal's Law states as, the intensity of pressure at any point in a liquid at rest is

(A) Same in all directions

(B) Different in all directions

(C) Zero pressure

(D) High pressure

(E) Answer not known

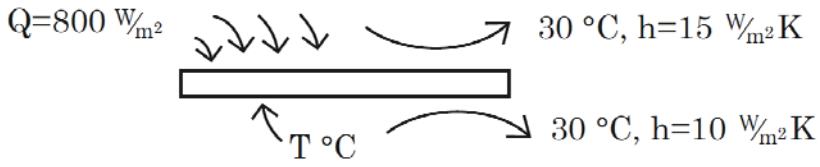
65. The critical thickness of insulation for sphere, ${}^{r}C_{r}$

(A) k/h (B) $4\ k/h$

(C) $2\ k/h$ (D) $2\ h/k$

(E) Answer not known

66. A steel plate is exposed to solar heat flux of 800 W/m^2 on one side. The plate is exposed to Air at 30°C on both sides. The convection coefficients are 10 $W/m^2\ K$ on the back side and 15 $W/m^2\ K$ on the front. Determine the equilibrium temperature. Neglect Radiation loss.



(A) T = 62° C
(B) T = 72° C
(C) T = 82° C
(D) T = 52° C
(E) Answer not known

67. The product of Reynolds number and Prandtl number is _____.

(A) Graetz number
(B) Peclet number
(C) Schmidt number
(D) Sherwood number
(E) Answer not known

68. Kinematic Viscosity is defined as the ratio between the dynamic velocity and _____.

(A) Viscosity of fluid
(B) Density of fluid
(C) Specific gravity of fluid
(D) None of the above
(E) Answer not known

69. Jet condensors is an example of

(A) Context heat exchangers
(B) Recuperator heat exchangers
(C) Regenerative heat exchangers
(D) Plate type heat exchangers
(E) Answer not known

70. The economy of Single Effect evaporator is

(A) Nearly less than one
(B) Greater than one
(C) One
(D) Zero
(E) Answer not known

71. 2-4 shell and tube heat exchanger means

(A) 4 shell side pass 2 tube side pass
(B) 2 shell side pass 4 tube side pass
(C) 2 shell side pass 2 tube side pass
(D) 4 shell side pass 4 tube side pass
(E) Answer not known

72. The Louis of black body radiation is the

(A) Stefan-boltzmann law
(B) Fourier law
(C) Focks law
(D) None of the above
(E) Answer not known

73. In Heat Exchanger, a better recovery can be obtained by adding a

(A) Horizontal baffle
(B) Vertical baffle
(C) Longitudinal baffle
(D) Baffle
(E) Answer not known

74. In shell and tube condenser to obtain layer velocities, higher heat transfer coefficient and shorter tubes the multipass principle used in

(A) Exchanger
(B) Heat Exchanger
(C) Dryer
(D) Evaporation
(E) Answer not known

75. Buoyancy force exist in

(A) Forced Convection
(B) Natural Convection
(C) Convection
(D) Air velocity
(E) Answer not known

76. In a Jacket design of a Agitated Vessel of Heat transfer has

(A) Spiral baffles
(B) Baffles
(C) Jacketed baffle
(D) None of the above
(E) Answer not known

77. A Piezometer tube is suitable for measuring

(A) Negative pressure
(B) Gauge pressure
(C) Absolute pressure
(D) Atmospheric pressure
(E) Answer not known

78. Match correctly the classification of fluids with their examples :

(a)	Newtonian fluid	1.	Paint
(b)	Non-Newtonian fluid	2.	Imaginary fluid
(c)	Ideal fluid	3.	Lubricating oil
(d)	Real fluid	4.	Water

	(a)	(b)	(c)	(d)
(A)	2	3	4	1
(B)	2	4	1	3
(C)	4	1	2	3
(D)	3	4	1	2

(E) Answer not known

79. Determine the bulk modulus of elasticity of a liquid, if the pressure of the liquid is increased from 70 N/cm^2 to 130 N/cm^2. The volume of the liquid decreases by 0.15 percent.

(A) 4 N/cm^2

(B) 4×10^3 N/cm^2

(C) 4×10^5 N/cm^2

(D) 4×10^4 N/cm^2

(E) Answer not known

80. Bernoulli's Equation mathematically is expressed as

(A) $\frac{P}{w} + \frac{V^2}{2g} + Z = \text{Constant}$

(B) $\frac{P}{w^2} + \frac{V}{2g} + Z = \text{Constant}$

(C) $\frac{P^2}{w} + \frac{V}{2g} + Z = \text{Constant}$

(D) $\frac{P}{w^2} + \frac{V^2}{2g} + Z = \text{Constant}$

(E) Answer not known

81. Ferritic stainless steel is characterized is

(A) a simple hexagonal crystal structure

(B) a body-centred cubic crystal structure

(C) a face-centred cubic crystal structure

(D) an ortho rhombic crystal structure

(E) Answer not known

82. In martensitic stainless steel, the difference between the chromium percentage and seventeen times the carbon content is

(A) Less than 12.5%

(B) Greater than 12.5%

(C) Greater than 24%

(D) Less than 18%

(E) Answer not known

83. The total carbon content in pig iron may be

(A) 0.08 to 0.2%
(B) 0.1 to 1.5%
(C) 3.0 to 5%
(D) 16 to 24%
(E) Answer not known

84. German silver is an alloy of copper, nickel and

(A) Zinc
(B) Silver
(C) Tin
(D) Lead
(E) Answer not known

85. Corrosion resisting chromium-nickel steels contain

(A) 16-24% Cr, 7-12% Ni, 1.5-2.0% Mn
(B) 35-36% Cr, 1.5-2.0% Ni, 8-14% Mn
(C) 7-12% Cr, 1.5-2.0% Ni, 16-24% Mn
(D) 1.5-2.0% Cr, 7-12% Ni, 16-24% Mn
(E) Answer not known

86. Nano materials are thermodynamically unstable in initial state of synthesis because

(A) Large surface energy
(B) Reduced Gibbs energy
(C) Increased internal stress
(D) Less surface energy
(E) Answer not known

87. Nano materials confined in all three dimensions are termed as

(A) Nano rods
(B) Nano tube
(C) Nano wall
(D) Quantum dot
(E) Answer not known

88. The composite materials composed of cermic and metal is called as _____.

(A) Non linear composites
(B) Cermet
(C) Particulate process
(D) Linear compositer
(E) Answer not known

89. For a given impeller, K and β_2 are related by the equation

(A) $\tan \beta_2 = \sqrt{\frac{2k}{1+k}}$
(B) $\tan \beta_2 = \sqrt{\frac{k}{1+k}}$
(C) $\tan \beta_2 = \sqrt{\frac{1-k}{2k}}$
(D) $\tan \beta_2 = \sqrt{\frac{2k}{1-k}}$
(E) Answer not known

90. In differential settling method, the particles are separated based on their

(A) differences in size
(B) differences in mass
(C) differences in density
(D) differences in volume
(E) Answer not known

91. The separation factor of a cyclone 0.5 m in diameter and having a tangential velocity of 20 m/s near the wall is (g is acceleration due to gravity in m/s^2)

(A) 1600/g
(B) 800/g
(C) g/1600
(D) g/800
(E) Answer not known

92. The Tyler Standard screen series is based on the opening of the 200-mesh screen, which is accepted at

(A) 0.074 mm
(B) 0.74 mm
(C) 0.0074 mm
(D) 7.4 mm
(E) Answer not known

93. 20 mesh screen means

(A) 20 openings per linear inch
(B) 20 openings per linear cm
(C) 20 openings per square inch
(D) 20 openings per square cm
(E) Answer not known

94. For long distance transportation of cold : non abrasive granular/irregular shape/fine materials the most suitable conveyor is

(A) Bucket
(B) Belt
(C) Screw
(D) Apron
(E) Answer not known

95. _____ are non metallic organic substances, which are brittle and have good thermal and electrical insulation properties.

(A) Ceramics and glasses
(B) Metal and alloys
(C) Organic polymers
(D) None of the above
(E) Answer not known

96. Which one of the following structure is examined with naked eye or under a low magnification?

(A) Crystal structure
(B) Macro structure
(C) Nuclear structure
(D) Electronic structure
(E) Answer not known

97. Work index is defined as the gross energy requirement in kilowatt hours per ton of feed, needed to reduce a very large feed to such a size that 80% of product passes through _____ screen.

(A) 10 μm
(B) 50 μm
(C) 100 μm
(D) 1000 μm
(E) Answer not known

98. For a non-spherical particle, the sphericity is defined as

(A) $\frac{6/D_P}{S_P/V_P}$
(B) $\frac{S_P/V_P}{6/D_P}$
(C) $\frac{V_P/S_P}{D_P/6}$
(D) $\frac{6\ S_P}{V_P \cdot D_P}$
(E) Answer not known

Where
D_P = Nominal diameter of particle
S_P = Surface area of one particle
V_P = Volume of one particle

99. For Laminar flow conditions, the relationship between the Pressure drop (ΔP) across an incompressible filter cake and the surface area per unit volume of particles (S_0) of the particles being filtered is given by one of the following

(A) ΔP is proportional to S_0
(B) ΔP is proportional to S_0^2
(C) ΔP is proportional to $\frac{1}{S_0}$
(D) ΔP is proportional to $\frac{1}{S_0^2}$
(E) Answer not known

100. Statement 1 : Grinding laws are based on the energy required for the creation of new surface area.

Statement 2 : All the laws are based on the principle that the energy required per unit area of the surface is directly proportional to the size of the particle.

(A) True, False
(B) True, True
(C) False, False
(D) False, True
(E) Answer not known

101. The suspended solids concentration present in a sample of water are measured by _____.

(A) Volumetric method
(B) Calorimetric method
(C) Gravimetric method
(D) pH Scale
(E) Answer not known

102. POP is

(A) Persistent Oxidizing Pollutants
(B) Permanent Organic Pesticides
(C) Persistent Organic Pesticides
(D) Persistent Organic Pollutants
(E) Answer not known

103. Global Atmospheric Temperatures are likely to be increased due to

(A) Burning of Fossil Fuels
(B) Water Pollution
(C) Soil Erosion
(D) Poor Regulations
(E) Answer not known

104. The most important environmental issue threatening human health is

(A) Noise pollution
(B) Ozone layer depletion
(C) Acid rain
(D) Alkaline rain
(E) Answer not known

105. A prohibited waste should not be disposed on _____ according to LDR.

(A) Land
(B) Air
(C) Water
(D) Facility
(E) Answer not known

106. WAP comply requirement under law

(A) SARA
(B) CERCLA
(C) RCRA
(D) HAP
(E) Answer not known

107. The purpose of a safety training program is

(A) To educate workers about potential hazards
(B) To identify potential hazards in work place
(C) To increase worker productivity
(D) To improve the quality of a products
(E) Answer not known

108. Form distribution in Engineering system classification of hazardous waste is based on _____.

(A) Solvents
(B) Heavy metals
(C) Phase
(D) Treatability
(E) Answer not known

109. The combination of AOP (Advanced Oxidation Process) with Chemical or Biological process can _____ their overall efficiency.

(A) Decrease
(B) Remains constant
(C) Increase
(D) No effect
(E) Answer not known

110. Alum as a coagulant is found to be more effective when pH range of water is

(A) 6-8
(B) 7-9
(C) 5-7
(D) 3-5
(E) Answer not known

111. The term used for the reuse of sewage sludge is

(A) Bio solids
(B) Potential solids
(C) Manure
(D) Solids
(E) Answer not known

112. _____ comes under the chemical monitoring of the lake.

(A) Detergents
(B) Pathogens
(C) Conductivity
(D) Turbidity
(E) Answer not known

113. How often should EAP drills be conducted in Organizations?

(A) Monthly
(B) Annually
(C) Biannually
(D) Weekly
(E) Answer not known

114. Can an EAP be modified and updated?

(A) No, it should remain unchanged
(B) Yes, it should be reviewed and updated regularly
(C) Only once every decade
(D) Only when a major emergency occurs
(E) Answer not known

115. According to Heinrich's triangle what happen before a serious accident (or) injury occurs?

(A) Several Unsafe behaviors and near misses
(B) Managerial investigations
(C) Work reports of safety concerns
(D) Safety training
(E) Answer not known

116. "Fugitive dust" includes

(A) Pollens
(B) Wind blown dust
(C) Dust from Industrial Processes
(D) All of the above
(E) Answer not known

117. The primary goal of Industrial safety is

(A) To reduce the risk of accidents and injuries in the work place
(B) To maximize profits for the company
(C) To increase worker productivity
(D) To improve the quality of products
(E) Answer not known

118. _____ colour is used for radiation hazard.

(A) Red
(B) Orange
(C) Green
(D) Purple
(E) Answer not known

119. Psychosocial hazards arise from the workers failure to adapt to

(A) Mechanical causes
(B) An Alien Psychosocial Environment
(C) Cessation
(D) Pneumoconiosis
(E) Answer not known

120. Occupational Safety and Health is concerned with health and welfare of

(A) Co-workers
(B) Family members
(C) Employees
(D) All of the above
(E) Answer not known

121. Name the type of reactors take long chain hydrocarbons and crack them to produce a shorter chain hydrocarbons

(A) FCC
(B) BFB
(C) CFB
(D) All of the above
(E) Answer not known

122. The Emulsion stays at minimum fluidization conditions in K-L model for BFB, the relative Gas-solid velocity should be _____.

(A) Stay constant
(B) Increases
(C) Decreases
(D) None of the above
(E) Answer not known

123. Fluidized Catalyst cracking reactor are also called as

(A) CAT
(B) Crackers
(C) CAT Crackers
(D) CAT Reactors
(E) Answer not known

124. In the deactivation catalyst steps, an impurity in the feed may deposit on and deactivate the surface is called _____.

(A) Parallel Deactivation
(B) Series Deactivation
(C) Side by side Deactivation
(D) Parallel and Series Deactivation
(E) Answer not known

125. The activity of a Catalyst pellets of any time is defined as

(A) $\frac{-VA^1}{-V_{A0}^1}$

(B) $\frac{-V_A^1}{-V^1}$

(C) $\frac{V_A^1}{V_{A0}^1}$

(D) $\frac{-V_A^1}{VA_0}$

(E) Answer not known

126. Restoration of Catalyst activity is called as

(A) Reactivation
(B) Deactivation
(C) Poison
(D) Uniform
(E) Answer not known

127. The effectiveness of solid catalyst for the reaction of stable molecules is dependent on

(A) Chemisorption
(B) Adsorption
(C) Absorption
(D) Diffusion
(E) Answer not known

128. In solid catalysed reactions the diffusional effects are more lightly to affect the over all rate of reaction for

(A) Fast reactions in catalyst of small pore diameter
(B) Fast reactions in catalyst of large pore diameter
(C) Slow reaction in catalyst of small pore diameter
(D) Slow reaction in catalyst of large pore diameter
(E) Answer not known

129. The unit for first order reaction rate constant is

(A) Time^{-1}
(B) Moles litre^{-1}
(C) Litre moles^{-1}
(D) Moles litre^{-1} time^{-1}
(E) Answer not known

130. The dispersion model may be used for _____ reactors.

(A) Ideal tubular
(B) Non-ideal tubular
(C) Ideal CSTR
(D) Non-ideal CSTR
(E) Answer not known

131. List the metabolic product in glycolysis

(A) Acetic acid
(B) Ester
(C) Resin
(D) Polymers
(E) Answer not known

132. Kinetics of solids catalysed reaction can be studied in a reactor

(A) Mixed
(B) Homogeneous
(C) Separated
(D) Normal
(E) Answer not known

133. Back mixing is most predominant in

(A) A well stirred batch reactor
(B) A PFR
(C) CSTR connected in series
(D) A single CSTR
(E) Answer not known

134. Performance of a cascade CSTR can be improved by adding

(A) More CSTR in parallel
(B) More CSTR in series
(C) APF reactor in series
(D) APF reactor in parallel
(E) Answer not known

135. In pore diffusion, shell thickens with time and the deactivation front moves inward, we call this the ———————— for poisoning.

(A) Shell model
(B) Care model
(C) Pellet model
(D) Interior model
(E) Answer not known

136. Which parameter alter the conversion of a tubular reactor?

(A) Time
(B) Speed
(C) Temperature
(D) Rate
(E) Answer not known

137. The rate constant of a first order reaction depend on the

(A) Temperature
(B) Concentration
(C) Time
(D) Pressure
(E) Answer not known

138. In homogenous systems, the volume of fluid in the reactor is identical to

(A) Moles of fluid
(B) Volume of reactor
(C) Molecular weight of fluid
(D) Pressure and temperature
(E) Answer not known

139. A reactions in which the rate equation corresponds to a stoichiometric equation are called

(A) Non-elementary reactions
(B) Elementary reactions
(C) Multiple reactions
(D) Series reactions
(E) Answer not known

140. The ratio of volume of particles to the volume of reactor is called as

(A) Solid holdup
(B) Solid loading
(C) Liquid holdup
(D) Liquid loading
(E) Answer not known

141. In a closed-loop response of a system, time needed for the response to reach the desired value for the first time is called as

(A) Settling time
(B) Decay ratio
(C) Rise time
(D) Delay time
(E) Answer not known

142. Consider the following statements regarding negative feed back in a closed loop system

(1) It increases sensitivity

(2) It minimize the effect of disturbance

(3) There is a possibility of instability

(4) It improves the transient response

(A) 1, 3 and 4 are correct
(B) 1, 2 and 4 are correct
(C) 1, 2 and 3 are correct
(D) 2, 3 and 4 are correct
(E) Answer not known

143. Multiplication of magnitude can be converted in to addition in which of the following?

(A) Nyquist plot
(B) Nichols plot
(C) Bode plot
(D) Quasi chart
(E) Answer not known

144. Which one of the following statements is true for gain margin and phase margin of two closed loop systems having loop transfer functions G(S) and e^{-S} G(S) H(S)?

(A) Both gain and phase margin of two systems will be Identical

(B) Both gain and phase margin of G(S) H(S) will be more

(C) Gain margin of two system are same but phase margin of G(S) H(S) will be less

(D) Phase margin of two systems are the same but gain margin of G(S) H(S) will be less

(E) Answer not known

145. A quantity whose magnitude has a definite repeating time cycle is called

(A) Transient
(B) Steady state periodic
(C) Steady state aperiodic
(D) Transient state periodic
(E) Answer not known

146. The Transfer Function of a system is $G(S)=\frac{100e^{-St}}{S(S+10)}$ then the system is a

(A) Linear system
(B) Non-linear system
(C) Transportation lay
(D) Steady state system
(E) Answer not known

147. The expected value of the voltage across a resistor is 90 V, however the measurement gives a value of 89 V. Calculate absolute error

(A) 4 V
(B) 3 V
(C) 1 V
(D) 9 V
(E) Answer not known

148. A mercury thermometer having a time constant of 0.1 min placed in temperature bath at 100°F and allowed to come to equilibrium with the bath at time t = 0. The temperature of the bath begins to vary sinusoidly about its average temperature of 100°F with an amplitude of 2°F. if the frequency of oscillation is 2°F if the frequency of oscillation is $10/\pi$ cycle/min. Find the radiation frequency.

(A) 33 rad/min
(B) 40 rad/min
(C) 20 rad/min
(D) 10 rad/min
(E) Answer not known

149. ———————— control configuration have one manipulated variable and more than one measurement.

(A) Split –range
(B) Selective
(C) Cascade
(D) Adaptive
(E) Answer not known

150. Among the type of control, ———————— is used eliminate any offset.

(A) Derivative
(B) Integral
(C) Proportional
(D) Proportional – Derivative
(E) Answer not known

151. The nature of roots of over damped system is

(A) Complex
(B) Real
(C) Unequal
(D) Real and unequal
(E) Answer not known

152. The T_1 value for PID controller according to Ziegler - Nicholes controller settings

(A) $\frac{\rho u}{8}$
(B) $\frac{\rho u}{2}$
(C) $\frac{\rho u}{4}$
(D) $\frac{\rho u}{6}$
(E) Answer not known

153. For the following given data calculate the arithmetic mean

$X_1 = 49.7$

$X_2 = 50.1$

$X_3 = 50.2$

$X_4 = 49.6$

$X_5 = 49.7$

(A) 59.7 (B) 49.86

(C) 43.2 (D) 71.4

(E) Answer not known

154. Find the general solution of $y'' - y' + 12y = 0$

(A) $C_1 e^{4x} + C_2 e^{-3x}$ (B) $C_1 e^{4x}$

(C) $C_2 e^{-3x}$ (D) $C_1 e^{-4x} + C_2 e^{3x}$

(E) Answer not known

155. Solutions of simultaneous non linear equation can be obtained using

(A) Method of iteration (B) Newton – Raphson method

(C) Power method (D) Partition method

(E) Answer not known

156. The command input for a regulator becomes a constant is called as

(A) Controlled variable (B) Manipulated variable

(C) Set point (D) Load variable

(E) Answer not known

157. Amplitude ratio of transportation lag is

(A) 0.1 (B) 100

(C) 10 (D) 1

(E) Answer not known

158. Dynamic system characterization by a transfer function can be done only for the ———————— system.

(A) Cubic (B) Quadratic

(C) Linear (D) Polynominal

(E) Answer not known

159. Laplace transform of $\cosh(at)$ is

(A) $\frac{s}{s^2 + a^2}$ (B) $\frac{s}{s^2 - a^2}$

(C) $\frac{1}{s^2}$ (D) $\frac{1}{a^2}$

(E) Answer not known

160. A current in a circuit in S domain is given by $l(S) = \frac{100}{S\left(S^2 + 10S + 20\right)}$. What will be the final value of the current?

(A) 10 amp (B) 15 amp

(C) 20 amp (D) 5 amp

(E) Answer not known

161. The refractive index of naphthas varies

(A) Inversely with both wave length and temperature
(B) Directly with both wave length and temperature
(C) Inversely with wave lengths and directly with temperature
(D) Directly with wave lengths and inversely with temperature
(E) Answer not known

162. The modulus of elasticity of ceramics has a range of

(A) 8×10^4 to 40×10^4 N/mm^2
(B) 7×10^4 to 42×10^4 N/mm^2
(C) 7×10^4 to 45×10^4 N/mm^2
(D) 10×10^4 to 42×10^4 N/mm^2
(E) Answer not known

163. Clinker is the mass obtained by heating

(A) Powdered limestone and clay
(B) Gypsum
(C) Dolomite
(D) Sand, limestone and washing soda
(E) Answer not known

164. Mixed Fertilizer contain three principle elements (Nitrogen, Phosphorous and Potassium) 5-10-5 mixed fertilizer contains

(A) 5 wt% P_2O_5, 10% N, 5% K_2O
(B) 5 wt% N, 10% P_2O_5, 5% K_2O
(C) 5 wt% N, P_2O_5 10%, 5% K_2O
(D) 10 wt N, 10% P_2O_5, 5% K_2O
(E) Answer not known

165. Sulfuric acid manufacture by

(A) Wet-process
(B) Double absorption contact process
(C) Electric-Furnace process
(D) Steaming-out process
(E) Answer not known

166. ———————— type of energy received in the form of radiation, can be converted directly or indirectly into other forms of energy.

(A) Solar energy
(B) Thermal energy
(C) Tidal energy
(D) Wind energy
(E) Answer not known

167. Minimum temperature required for operating ocean thermal energy power plant?

(A) 50°C
(B) 20°C
(C) 30°C
(D) 10°C
(E) Answer not known

168. Propeller type windmill runs at speeds of

(A) 60 to 80 rpm
(B) 100 to 140 rpm
(C) 200 to 300 rpm
(D) 300 to 400 rpm
(E) Answer not known

169. In solar ponds operating in a sunny climate, salt (NaCl) is transported from non convective layer into upper convective layer at a rate of the order of

(A) 40 kg/m^2 year (or) 40 kg m^{-2} year^{-1}

(B) 40 kg/m^2 month (or) 40 kg m^{-2} month^{-1}

(C) 40 kg/m^{2}day (or) 40 kg m^{-2} day^{-1}

(D) 40 kg/m^2 hour (or) 40 kg m^{-2} hour^{-1}

(E) Answer not known

170. If $_{92}U^{238}$ emits one alpha particle, the remaining nucleus will contain

(A) 234 neutrons and 90 protons

(B) 236 neutrons + 88 protons

(C) 144 neutrons + 90 protons

(D) 145 neutrons and 93 protons

(E) Answer not known

171. Glucose is converted into ethyl alcohol and CO_2 by the enzyme

(A) Invertase (B) Zymase

(C) Maltase (D) Diastase

(E) Answer not known

172. List out the correct sequence of making dyes and intermediates A – Petroleum, B – Aromatic hydrocarbons, C – Intermediates, D – dyes

(A) A → B → C → D (B) A → D → C – B

(C) C → A – B – D (D) D → A → B – C

(E) Answer not known

173. An Alkali metal salt of palmitic acid is known as

(A) Soap
(B) Alkolid
(C) Explosive
(D) Detergent
(E) Answer not known

174. The material used as fat splitting catalyst in saponification process is

(A) Zinc oxide
(B) Palm oil
(C) Coconut oil
(D) Tallow
(E) Answer not known

175. The factor adversely affecting the fermentation process is

(A) Low concentration
(B) High concentration
(C) Presence of ammonium salts
(D) Presence of air
(E) Answer not known

176. In the chemical energy storage system, the main chemical constituent is,

(A) Hydrogen
(B) Carbon
(C) Nitrogen
(D) Sulphur
(E) Answer not known

177. Which type of thermal energy storage system is employed as sensible energy storage?

(A) Packed solid beds
(B) Gas pipelines
(C) Nuclear reactors
(D) Thermal power reactors
(E) Answer not known

178. Among, which type of batteries is called as Metal-Gas batteries?

(A) Nickel - Hydrogen
(B) Nickel - Zinc
(C) Nickel - Iron
(D) Silver - Cadmium
(E) Answer not known

179. The maximum theoretical energy efficiency of a fuel cell is

(A) 100%
(B) 69%
(C) 75%
(D) 83%
(E) Answer not known

180. Energy produced due to gravitational force of attraction between earth and moon or sun and earth is

(A) Tidal energy
(B) Hydro energy
(C) Wind energy
(D) Geo thermal energy
(E) Answer not known

181. The fugacity of liquid water at 303 K and 10 bar if the saturation pressure at 303 K is 4.241 KPa and specific volume of liquid water at 303 K is 1.004×10^{-3} m^3/kg, is

(A) 0.9426 bar
(B) 0.9427 atm
(C) 0.0427 atm
(D) 0.0427 bar
(E) Answer not known

182. The ratio of fugacity to pressure is referred to as

(A) Partition coefficient
(B) Activity coefficient
(C) Fugacity coefficient
(D) Coefficient of performance
(E) Answer not known

183. 1 kg of water at the top of a mountain of height about 426.8 m. At this position, water possesses a potential energy of nearly

(A) 41.87 KJ
(B) 41.87 J
(C) 4.187 J
(D) 4.187 KJ
(E) Answer not known

184. The net heat evolved or absorbed in a chemical reaction is the same whether the reaction takes place in a single step or in a series of steps. This is known as

(A) Hess's Law
(B) Kirchoff's Law
(C) Lavoisier and Laplace Law
(D) Boyle's Law
(E) Answer not known

185. Fugacity has the unit of

(A) Pressure
(B) Volume
(C) Temperature
(D) Density
(E) Answer not known

186. The difference between an actual property and the property that would be calculated for the same temperature, pressure and composition for an ideal solution is called

(A) Intrinsic property
(B) Ideal chemical property
(C) Excess property
(D) Excess enthalpy of a solution
(E) Answer not known

187. Volume expansivity is

(A) $\beta = V\left(\frac{\partial V}{\partial T}\right)_P$ (B) $\beta = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$

(C) $\frac{1}{V}\left(\frac{\partial V}{\partial P}\right)_T$ (D) $\frac{1}{V}\left(\frac{\partial T}{\partial P}\right)_V$

(E) Answer not known

188. The constants 'a' and 'b' of the Van der Waals equation $\left(P + \frac{a}{V^2}\right)(V - b) = RT$ are

(A) $a = \frac{27R^2T_c^2}{64P_c};\ b = \frac{RT_c}{8P_c}$ (B) $a = \frac{RT_c}{8P_c};\ b = \frac{27R^2T_c^2}{64P_c}$

(C) $a = \frac{64P_c}{27R^2T_c^2};\ b = \frac{8P_c}{RT_c}$ (D) $a = \frac{8P_c}{RT_c};\ b = \frac{64P_c}{27R^2T_c^2}$

(E) Answer not known

189. The absolute entrophy of a perfectly ordered crystal at absolute zero temperature is

(A) Zero (B) Infinite

(C) Positive (D) Negative

(E) Answer not known

190. The first law of thermodynamics takes the form $W = \Delta H$ when applied to

(A) A closed system undergoing a reversible adiabatic process

(B) An open system undergoing an adiabatic process with negligible changes in kinetic and potential energies

(C) A closed system undergoing a reversible constant volume process

(D) A closed system undergoing a reversible constant pressure process

(E) Answer not known

191. At 318 K and 25 KPa, composition of the system A and B at equilibrium is $x_A = 0.3$ and $y_A = 0.6$. The saturation pressure at the given temperature for the pure components are P_A^{sat} = 20 KPa and P_B^{Sat} = 10 KPa respectively. The liquid-phase activity coefficient of component $A(r_A)$ will be

(A) 1 (B) 1.5

(C) 2.0 (D) 2.5

(E) Answer not known

192. There is no flow of heat between the system and the surroundings is known as ———————— process.

(A) Isobaric (B) Isochoric

(C) Adiabatic (D) Isothermal

(E) Answer not known

193. A gas can be considered to be an ideal one at conditions (in comparison to their critical values) of

(A) low T and low P
(B) high T and low P
(C) low T and high P
(D) high T and high P
(E) Answer not known

194. Choose the correct answer absolute pressure is expressed by

(A) $P_{abs} = P_{atm} - P_{gauge}$
(B) $P_{abs} = P_{atm} + P_{gauge}$
(C) $P_{abs} = P_{vacuum} + P_{atm}$
(D) $P_{abs} = P_{vacuum} - P_{atm}$
(E) Answer not known

195. A cylinder contains 14.2 kg of liquid propane. What volume is litres will the propane occupy if it is released and brought to standard conditions? Take molecular weight of propane as 44.

(A) 14.2 lit
(B) 7.23 lit
(C) 7.23 cm^3
(D) 7.23 m^3
(E) Answer not known

196. In a textile mill, a double-effect evaporator system concentrates weak liquor containing 4% (by mass) caustic soda to produce a lye containing 25% solids (by mass). The evaporation of water per 100 kg feed in the evaporator is

(A) 16 kg
(B) 84 kg
(C) 25 kg
(D) 4 kg
(E) Answer not known

197. In unsteady state conditions, input and output parameters change with respect to

(A) Pressure
(B) Temperature
(C) Volume
(D) Time
(E) Answer not known

198. Yield is defined as

(A) $\frac{\text{moles of desired product} \times \text{stoichiometric factor}}{\text{moles of specific reactant consumed}}$

(B) $\frac{\text{moles of specific reactant consumed} \times \text{stoichiometric factor}}{\text{moles of desired product}}$

(C) $\frac{\text{moles of the specific reactants consumed} \times \text{moles of desired product}}{\text{stoichiometric factor}}$

(D) $\frac{\text{moles of the specific reactant consumed}}{\text{moles of desired product}}$

(E) Answer not known

199. Heat capacity is the amount of heat required to ———— the temperature by 1 K of 1 kg of substance.

(A) raise
(B) decrease
(C) increase (or) decrease
(D) equalize
(E) Answer not known

200. Volume is directly proportional to temperature in

(A) Charle's Law

(B) Boyle's Law

(C) Gay-Lussac's Law

(D) Avogadro's Law

(E) Answer not known