A.V. Education Society's

DEGLOOR COLLEGE, DEGLOOR

(MCQ)

Class - B.Sc. I st Year Subject – Physical Chemistry

Choose the correct answer of the following

1. The value of log 1 is ----------

   a) 0 b) 1 c) 2 d) 3

2. The value of log (uX v) is ----------

   a) log u X log v **b) log u + log v** c) log u – log v d) log u / log v

3. The value of log (u / v) is ----------

   a) log u X log v b) log u + log v **c) log u – log v** d) log u / log v

4. What is the value of log $(x)^n$?

   a) log x + log n b) log (x / n) **c) n log x** d) log x – log n

5. The value of sin (x + y) is ----------

   a) sin x . cos y – cos x . sin y b) sin x. sin y + cos x . cos y

   c) sin x . sin y – cos x . cos y **d) sin x . cos y + cos x . sin y**

6. The value of d/dx (x^n) ----------

   a) nx^{n+1} b) nx^{n-1} c) nx^n d) nx^{n+2}

7. The equation of straight line passing through origin is ----------

   a) y = mx + c **b) y = mx** c) $y - y_1 = m(x - x_1)$ d) x/a + y/b = 1

8. The intercept form of the line is given by equation ----------

   a) y = mx + c b) 2x + 3y = 1 c) x + 2y = 2 **d) x/a + y/b = 1**

9. The value of d/dx (log x) is ----------

   a) x b) x^2 **c) 1 / x** d) x / 2

10. The value of $\int dx$ is----------

    a) x b) x^2 c) 1 / x d) x / 2

11. Which of the following is correct ----------

    a) pH + pOH = 7 b) pH - pOH = 0 **c) pH + pOH = 14** d) b) pH - pOH = 14

12. Slope of any line parallel to x-axis is ----------

    a) 1 b) – 1 c) 0 **d) Not defined**

13. The equation $y - y_1 = m(x - x_1)$, m Є R represents the line ----------

    a) parallel to x-axis **b) parallel to y-axis** c) parallel to the line x – y = 0

    d) parallel to the line x + y = 0

14. The probability of sure event is ----------

    a) 1 b) 2 c) 1/2 d) zero

15. The probability of an impossible event is ----------

    a) 1 b) 2 c) 1/2 **d) zero**

16. The value of log x + log y is ----------

    a) log (x X y) b) log (x / y) c) log (x + y) d) log (x – y)

17. The value of log x – log y is ----------

a) log (x X y) **b) log (x / y)** c) log (x + y) d) log (x – y)

18. The value of d/dx . (sin x) is ----------

a) tan x b) cot x **c) cos x** d) – sin x

19. The value of d/dx . (cos x) is ----------

a) sin x b) cos x c) tan x **d) – sin x**

20. The value of d/dx . (tan x) is ----------

a) $\sec^2 x$ b) cot x c) $\sec^2 x$ d) cosec x

21. The value of $\int 1/x \, . \, dx$ is ----------

a) – x b) x^2 **c) log x** d) – log x

22. The straight line, whose gradients are m_1, m_2 respectively are parallel if ----------

a) $m_1 = 0$ b) $m_2 = 0$ c) $m_1.m_2 = 0$ **d) $m_1 = m_2$**

23. The straight lines $y = m_1x$ & $y = m_2x$ are perpendicular to each other if ----------

a) $m_1 = m_2$ **b) $m_1.m_2 = -1$** c) $m_1 = -m_2$ d) $m_1 = 1/m_2$

24. The graph of linear equation is always in the form of ----------

a) circle **b) straight line** c) sphere d) curve.

25. The value of $\log_{81} (243)$ is ----------

a) 6/4 **b) 5/4** c) 7/4 d) 9/4

26. The value of d/dx . (e^x) is ----------

a) e^x b) x c) x/2 d) x^2

27. d/dx . (a^x) is equal to ----------

a) log a^x b) x log a **c) a^x log a** d) none of these

28. The value of $\int \sin x \, . \, dx$ is ----------

a) cos x **b) – cos x** c) tan x d) cot x

29. The value of $\int x^7 \, . \, dx$ is ----------

a) $x^7 / 7$ **b) $x^8 / 8$** c) x^6 d) x^8

30. The characteristic of $\log_{10} (0.0062)$ is

a) 4 b) – 4 **c) – 3** d) 1

31. $\log_{10} (10000)$ is equal to ----------

a) 1 b) 2 c) 3 **d) 4**

32. for 1 mole of gas, the ideal gas equation is ----------

a) PV = 1/2 RT **b) PV = RT** c) PV = 2RT d) PV = 3/2 RT

33. The unit of gas constant 'R' is ----------

a) Joule $K^{-1}mol^{-1}$ b) erg $K^{-1}mol^{-1}$ c) cal $K^{-1}mol^{-1}$ **d) All of these**

34. The average kinetic energy of gas molecule is ----------

a) Directly proportional to its absolute temperature

b) Inversely proportional to its absolute temperature

c) Equal to square root of its absolute temperature

d) Directly proportional to square root of its absolute temperature

35. The RMS velocity is given by relation ----------

a) Crms = $\sqrt{2RT/M}$ **b) Crms =** $\sqrt{3RT/M}$ c) Crms = $\sqrt{RT/M}$ d) Crms = $\sqrt{8RT/M}$

36. The average velocity of a gas molecule is given by relation ----------

a) Vav =$\sqrt{RT/\pi M}$ b) V av= $\sqrt{2RT/\pi M}$ c) Vav = $\sqrt{3RT/\pi M}$ **d) Vav =** $\sqrt{\mathbf{8RT/\pi M}}$

37. The most probable velocity of a gas molecule is given by relation ----------

a) Vmp = **b) Vmp =** $\sqrt{\mathbf{2RT/M}}$ c) Vmp = $\sqrt{3RT/M}$ d) Vmp = $\sqrt{3RT/M}$

38. The compressibility factor 'z' is given by relation ----------

a) Z = PV/RT b) Z = PV/2RT c) Z = PV/RT^2 d) Z = 2PV/2RT

39. The real gases shows nearly ideal behavior at ----------

a) low pressure & low temperature **b) low pressure & high temperature**

c) high pressure & high temperature d) high pressure & low temperature

40. The critical temperature of CO_2 gas is ----------

a) 21° b) 25° **c) 31°** d) 50°

41. The kinetic gas equation is given by relation is ----------

a) PV = 1/3. mnu^2 b) PV = 1/2. mnu^2 c) PV = 3/2. mnu^2 d) PV = 2/3. mnu^2

42. The unit of Vanderwaal's costant 'a' is ----------

a) atm lit mol^{-1} b) atm lit^{-1} mol^{-1} **c) atm lit^2 mol^{-2}** d) atm lit^{-1} mol^2

43. The unit of Vanderwaal's costant 'b' is ----------

a) lit mol^{-1} b) lit mol^2 c) lit mol^{-2} d) lit^2 mol^{-1}

44. The compressibility factor 'z' an ideal gas ----------

a) zero b) less than one c) greater than one **d) equal to one**

45. A gas can be liquefied at ----------

a) low pressure & low temperature b) low pressure & high temperature

c) high pressure & high temperature **d) high pressure & low temperature**

46. The correct value of 'V_C' is given by term ----------

a) 3b b) a/27b^2 c) 8a/27Rb d) none of these

47. The correct value of 'T_C' is given by term ----------

a) 3b b) a/27b^2 **c) 8a/27Rb** d) none of these

48. The correct value of 'P_C' is given by term ----------

a) 3b **b) a/27b^2** c) 8a/27Rb d) none of these

49. The value of gas constant 'R' is ----------

a) 0.821JK^{-1}mol^{-1} **b) 8.314 JK^{-1}mol^{-1}**

c) 8.314 lit atm K^{-1}mol^{-1} d) None of these

50. The Root mean square velocity is given by relation ----------

a) Crms = $\sqrt{3PV/M}$ b) Crms = $\sqrt{3RT/M}$ c) Crms = $\sqrt{3P/D}$ **d) All of these**

51. Exclude volume is ---------- times the actual volume of molecule

a) two b) three **c) four** d) half

52. The pressure 'P' in the ideal gas equation is replaced by

a) (p + an^2/v^2) b) (p – an^2/v^2) c) (p + 2n^2/v^2) d) (p + n^2/v^2)

53) Which one of the following is correct Relation?

a) $V_C = 3b$ b) $P_C = a/27Rb^2$ c) $T_C = 8a/27Rb^2$ d) None of these

54. In Vanderwaal's equation, the term which accounts for intermolecular forces is ------

a) RT b) V – b **c) $p + a/V^2$** d) $(RT)^{-1}$

55. most of the molecules of any gas posses ----------

a) Average velocity **b) most probable velocity**

c) mean square velocity d) Normal velocity

56. On increasing temperature, most probable velocity of gas ----------

a) Increases b) decreases c) remains constant d) None of these

57. In Vanderwaal's equations of state for a non ideal gas, the net force of attractions among the molecule is given by ----------

a) an^2/v^2 b) $(p – an^2/v^2)$ c) $(p + an^2/v^2)$ d) $– an^2/v^2)$

58. In (lit atm k^{-1} mol^{-1}), the numerical value of 'R', the gas constant is ----------

a) 0.821 **b) 0.0821** c) 0.00821 d) 0.000821

59. For 1 mole of gas the kinetic energy is given by ----------

a) E = 1/2 RT b) E = 3/2 RT c) E = 5/2 RT d) 7/2 RT

60. Which of the following is an ideal gas?

a) H_2 b) N_2 c) CO_2 **d) None of these**

61. The value of Average velocity is given by ----------

a) 0.9213 x RMS velocity b) 0.8165 x RMS velocity

c) 0.9213 x most probable velocity d) None of these

62. The elements of symmetry are ----------

a) plane of symmetry b) Axis of symmetry

c) center of symmetry **d) All of these**

63. The Bragg's equation for diffraction of x-rays is ----------

a) $n\lambda = 2d \sin\Theta$ b) $n\lambda = 2d^2 \sin\Theta$ c) $n\lambda = 2d \sin^2\Theta$ d) $n\lambda = d \sin\Theta$

64. The number of atoms per unit cell in a simple cubic , fcc & bcc are ----------

a) 1, 2, 4 **b) 1, 4, 2** c) 4, 2, 1 d) 2, 4, 1

65. The number of atoms in unit cell of body centered cubic lattice is ----------

a) 0 b) 1 **c) 2** d) 3

66. The number of atoms in unit cell of face centered cubic lattice is ----------

a) 2 **b) 4** c) 6 d) 8

67. NaCl is an example of ----------

a) simple cubic lattice **b) face centered cubic lattice**

c) body centered cubic lattice d) None of these

68. KCl is an example of ----------

a) simple cubic lattice b) face centered cubic lattice

c) body centered cubic lattice d) None of these

69. In Bragg's equation $n\lambda = 2d \sin\Theta$, 'n' represents ----------

a) the number of moles b) Principle quantum number

c) Avogadro' number **d) Order of reflection**

70. NaCl is an example of ----------

a) covalent solid b) molecular solid **c) Ionic solid** d) metallic solid

71. If there are 4 atoms in unit cell in cubic system, it is an example of ----------

a) simple cubic lattice **b) face centered cubic lattice**

c) body centered cubic lattice d) None of these

72. The ratio of spacings in case of sodium chloride (NaCl) crystal is ----------

a) 1 : 0.704 : 1.136 b) 0.705 : 1.50 : 1.135

c) 1 : 0.504 : 0.75 d) None of these

73. The relative spacing for the unit cell of face centered cubic lattice are ----------

a) a/2 : a/$\sqrt{2}$: a/2$\sqrt{3}$ b) a/2 : a/$\sqrt{2}$: a/$\sqrt{3}$

c) a/2 : a/2$\sqrt{2}$: a/$\sqrt{3}$ d) None of these

74. The ratio of spacings in case of potassium chloride (KCl) crystal is ----------

a) 1 : 0.704 : 1.136 **b) 1 : 0.707 : 0.575**

c) 0.707 : 0.571 : 1 d) None of these

75. A crystalline solid have ----------

a) sharp edges b) flat faces c) definite geometrical form **d) All of these**

76. If the particles are at corners as well as at the center of cube , is called as ----------

a) simple cubic lattice b) face centered cubic lattice

c) body centered cubic lattice d) None of these

77. The value of log m – log n is ----------

a) $\log (m \times n)$ **b) log $\frac{m}{n}$** c) $\log (m + n)$ d) $\log (m - n)$

78. Value of $^{11}P_5$ is ----------

a) 540 **b) 504** c) 5040 d) none of these

79. Value of $^{9}C_3$ is ----------

a) 48 b) 254 c) 80 **d) 84**

80. Slope of the line passing through the points (2, 5) and (−4, −4) is ----------

a) − 3 b) 3 **c)** $\frac{3}{2}$ d) − $\frac{3}{2}$

81. find pH whose pOH is 6.9

a) 7.1 b) 7 c) 6.9 d) 7.2

82. pH is defined as ----------

a) $-$ **log [** H^+ **]** b) $+ \log [H^+]$ c) $+ \log [OH^-]$ d) $- \log [OH^-]$

83. pOH is defined as ----------

a) $- \log [H^+]$ b) $+ \log [H^+]$ c) $+ \log [OH^-]$ **d)** $-$ **log [** OH^- **]**

84. Permutation is ---------- of a number of objects taking some or all at a time.

a) selection b) rejection **c) arrangement** d) none of these

85. Combination is ---------- of a number of objects taking some or all at a time.

a) selection b) rejection c) arrangement d) none of these

86. The compressibility factor 'z' of an ideal gas is ----------

a) zero b) less than one c) greater than one **d) equal to one**

89. Critical Temperature means above this temperature at any pressure, any gas can be ----------

a) Liquefied **b)Not liquefied** c) solidified d) All of these

90. Excluded volume is ---------- times the actual volume of molecule

a) two b) three **c) four** d) half

91. RMS velocity is directly proportional to ----------

a) $\sqrt{\mathbf{T}}$ b) T^2 c) T d) $\frac{1}{\sqrt{T}}$

92. A plane can be expressed as $\frac{1}{2}a : \frac{1}{3}a : \frac{2}{3}a$ & Miller indices are ----------

a) (3 6 4) b) (4 3 6) **c) (4 6 3)** d) (3 2 6)

93. Critical constant of water Vc is 0.49 Lit/mol, the Vander waal constant b is ----------

a) 0.153 Lit/mol b) 0.173 Lit/mol c) 0.163 Lit mol **d) 0.163 Lit/mol**

94. Pc is 70 atm, b is 0.0458 Lit/mol & vander waal's constant a is ----------

a) 3.969 atm Lit^2/mol^2 b) 3.969 atm /Lit^2mol^2 c) 3.76 atm Lit^2/mol^2 d) 3.76 atm/Lit^2mol^2

95. The Vander waal's constant a = 0.751atm Lit^2/mol^2 & b = 0.0226 Lit/mol, Tc is ----------

a) 120 °C b) 115 °C **c) 120 K** d) 115 K

96. Isotherm means ----------

a) P-T curves at constant V b) V-T curves at constant P

c) P- V curves at constant T d) None of these

97. RMS velocity of oxygen is 1500 m/sec, Temperature is ----------

($M = 32 \times 10^{-3}$ kg, R = 8.314 J/K/mol)

a) 2886 K b) 2886 °C c) 2856 K d) 2856°C

98. RMS velocity of ammonia gas at 50 °C is ----------

($M = 17 \times 10^{-3}$ kg, R = 8.314 J/K/mol)

a) 6.588 x 10^2 m/sec b) 6.588 x 10^2 cm/sec c) 6.884 x 10^2 cm/sec **d) 6.884 x 10^2 m/sec**

99. Value of $^9P_3$ is ----------

a) 540 **b) 504** c) 5040 d) none of these

100. Value of $^{12}C_8$ is ----------

a) 459 b) 954 c) 485 **d) 495**

101. $\frac{da^x}{dx}$ is equal to ----------

a) a^x log x b) x^a log a **c) a^x log a** d) none of these

102. pH is 7.05, $[H^+]$ is ----------

a) 8.913×10^{-8}mol/ Lit b) 8.83×10^{-8} mol/ Lit c) 8.913×10^{-7}mol/ Lit d) None of these

103. The phenomenon of concentration of molecules of a gas or liquid at a solid surface is Called ----------

a) absorption **b) adsorption** c) catalysis d) None of these

104. Adsorbate is that substance ----------

a) which concentrate on the surface b) where adsorption takes place

c) which evaporates from the surface d) None of these

105. Increase in ---------- of the adsorbent increases the total amount of the gas adsorbed.

a) density b) volume **c) surface area** d) surface tension

106. ---------- the critical temperature of the gas, the more readily will it be adsorbed.

a) lower **b) Higher** c) intermediate d) None of these

107. The process of adsorption is ----------

a) exothermic b) endothermic

c) sometimes exothermic, sometimes endothermic d) None of these

108. Physical adsorption is a ---------- process.

a) reversible b) irreversible c) exothermic d) None of these

109. Physical adsorption occurs rapidly at ---------- temperature.

a) low b) Higher c) absolute zero d) None of these

110. Physical adsorption generally ---------- with increasing temperature.

a) increases **b) decreases**

c) sometimes increases, sometimes decreases d) None of these

111. Chemical adsorption generally ---------- with increasing temperature.

a) increases b) decreases

c) sometimes increases, sometimes decreases d) remains the same

112. The relationship between equilibrium pressure of a gas and its amount adsorbed on the solid adsorbent at constant temperature is called ----------

a) chemisorption b) adsorption isobars **c) adsorption isotherms** d) None of these

113. Freundlich isotherm is not applicable at ----------

a) room temperature b) low pressure c) 273 K **d) high pressure**

114. In physical adsorption the gas molecules are held to the solid surface by ----------

a) hydrogen bond b) pi bond c) sigma bond **d) vander Waal's forces**

115. Langmuir isotherm holds at low pressure but fails at ----------

a) room temperature b) low pressure **c) high pressure** d) 273 K

116. the rate desorption Rd is given by

a) $R_d = K_d \theta$ b) $R_d = K_d / \theta$ c) $R_d = K_d \theta^2$ d) $R_d = K_d / \theta^2$

117. Langmuir while deriving adsorption isotherms did not make the following assumption

a) the layer of the gas adsorbed on the solid surface is one molecule thick.

b) the adsorbed layer is uniform

c) there is no attraction between adjacent molecules.

d) there is attraction between adjacent molecules

118. which of the following is incorrect?

a) chemisorptions is caused by bond formation

b) chemisorptions is specific in nature

c) chemisorption is reversible

d) chemisorptions increases with increase in temperature.

119. which of the following is incorrect statement?

a) physical adsorption is irreversible in nature

b) physical adsorption involves multi-molecular layers.

c) In physical adsorption the energy evolves is small

d) physical adsorption is caused vander Waal's forces

120. which of the following is incorrect?

a) physical adsorption is reversible in nature

b) In chemical adsorption the ΔH is large

c) In physical adsorption the ΔH is small

d) chemisorption is reversible in nature