ARJUNA-NEET(Chemistry)

PRACTICE TEST-02

46. If the Vander Waal's constants of gas A are given as-
a (atm L^2 mol^{-2}) = 6.5, b (L mol^{-1}) = 0.056 than ciritical pressure of A is
(A) 56.24 atm (B) 76.77 atm
(C) 42.44 atm (D) 36.42 atm

47. The correct relationship between T_C, T_B and T_i is –
(A) $T_C < T_B < T_i$ (B) $T_C > T_B > T_i$
(C) $T_C < T_i < T_B$ (D) $T_i < T_B < T_C$

48. The Van der Waal's parameters for gases W, X, Y and Z are

Gas	a (atm L^2 mol^{-2})	b ($Lmol^{-1}$)
W	4.0	0.027
X	8.0	0.030
Y	6.0	0.032
Z	12.0	0.027

Which one of these gases has the highest critical temperature?
(A) W (B) X
(C) Y (D) Z

49. For H_2 gas, the compressibility factor, Z = PV/n RT is –
(A) equal to 1
(B) equal to 0
(C) always greater than 1
(D) initially less than 1 and then becomes greater than 1 at high pressures

50. The units of the van der Waal's constant 'b' are
(A) atmosphere (B) joules
(C) L mol^{-1} (D) mol L^{-1}

51. The units of the Van der Waal's constant 'a' are-
(A) atm L^2 mol^{-2}
(B) atm L^{-2} mol^{-2}
(C) atm L mol^{-1}
(D) atm mol L^{-2}

52. Molecular attraction and size of the molecules in a gas are negligible at -
(A) Critical point
(B) High pressure
(C) High temperature and low pressure
(D) Low temperature and high pressure

53. Critical temperature of the gas is the temperature-
(A) Below which it cannot be liquified
(B) Above which it cannot be liquified
(C) At which it occupies 22.4 L of volume
(D) At which one mole of it occupies volume of 22.4 L

54. The critical temperature of a substance is -
(A) The temperature above which the substance undergoes decomposition
(B) The temperature above which a substance can exist only as a gas
(C) Boiling point of the substance
(D) All are wrong

55. The term that accounts for intermolecular force in vander Waal's equation for non-ideal gas is -
(A) RT (B) V - b
(C) (a / V^2) (D) $[RT]^{-1}$

56. The correct expression for the vander waal's equation of states is -
(A) $(p + a/n^2V^2)(V - nb) = nRT$
(B) $(p + an^2/V^2)(V - nb) = \Delta nRT$
(C) $(p + an^2/V^2)(V - b) = nRT$
(D) $(p + an^2/V^2)(V - nb) = nRT$

57. A gas 'A' having molecular weight 4 diffuses thrice as fast as the gas B. The molecular weight of gas B is-
(A) 36 (B) 12
(C) 18 (D) 24

58. The kinetic energy of 1 mole of gas is equal to –
(A) 3/2 RT (B) 2/3 KT
(C) RT/2 (D) 2R/3

59. Which is not correct in terms of kinetic theory of gases-
(A) Gases are made up of small particles called molecules
(B) The molecules are in random motion
(C) When molecules collide, they lose energy
(D) When the gas is heated, the molecules moves faster

60. Air contains 79% N_2 and 21% O_2 by volume. If the pressure is 750 mm of Hg, the partial pressure of O_2 is –
(A) 157.5 mm of Hg
(B) 175.5 mm of Hg
(C) 315.0 mm of Hg
(D) 257.5 mm of Hg

61. Equal masses of SO_2, CH_4 and O_2 are mixed in empty container at 298 K, when total pressure is 2.1 atm. The partial pressures of CH_4 in the mixture is –
(A) 0.5 atm (B) 0.75 atm
(C) 1.2 atm (D) 0.6 atm

62. The total pressure of a mixture of two non-reactive gases is
(A) The sum of partial pressures of each gas
(B) The difference in partial pressures
(C) The product of partial pressures
(D) The ratio of partial pressures.

63. At room temperature Dalton's law of partial pressure is not applicable to –
(A) H_2 and N_2 mixture
(B) H_2 and Cl_2 mixture
(C) H_2 and CO_2 mixture
(D) None

64. A cylinder is filled with a gaseous mixture containing equal masses of CO and N_2. The ratio of their partial pressure is-
(A) $P_{N2} = P_{CO}$
(B) $P_{CO} = 0.875\ P_{N2}$
(C) $P_{CO} = 2\ P_{N2}$
(D) $P_{CO} = 1/2\ P_{N2}$

65. A gas is found to have a formula $[CO]_x$. If its vapour density is 70 the value of x is –
(A) 2.5 (B) 3.0
(C) 5.0 (D) 6.0

66. The value of gas constant per mole is approximately-
(A) 1 cal (B) 2 cal
(C) 3 cal (D) 4 cal

67. The value of gas constant R is 8.314 X. Here X is represent –
(A) Litre atm K^{-1} mol^{-1}
(B) Cal mol^{-1} K^{-1}
(C) J K^{-1} mol^{-1}
(D) None of the above

68. When the pressure of 5L of N_2 is doubled and Its temperature is raised from 300K to 600K, the final volume of the gas would be-
(A) 10 L (B) 5 L
(C) 15 L (D) 20 L

69. If the density of a gas A is 1.5 times that of B then the molecular mass of A is M. The molecular mass of B will be-
(A) 1.5 M (B) M/1.5
(C) 3M (D) M/3

70. One litre of an unknown gas weighs 1.25 gm at N.T.P. which of the following gas pertains to the above data –
(A) CO_2 (B) NO_2
(C) N_2 (D) O_2

71. The density of a gas is equal to? (P = pressure; V = volume; T = temperature, R = gas constant, n = number of moles and M = molecular wt.) –
(A) nP (B) PM/RT
(C) P/RT (D) M/V

72. The percentage of nitrogen in urea is about-
(A) 38.4 (B) 46.6
(C) 59.1 (D) 61.3

73. The density of air is 0.001293 gm/ml at S.T.P. It's vapour density is –
(A) 143 (B) 14.3
(C) 1.43 (D) 0.143

74. 16 gm of SO_x occupies 5.6 litre at STP. Assuming ideal gas nature, the value of x is -
(A) 1 (B) 2
(C) 3 (D) None of these

75. Number of moles of water in 488 gm of $BaCl_2 .2H_2O$ are - (Ba = 137)
(A) 2 moles (B) 4 moles
(C) 3 moles (D) 5 moles

76. Equal masses of O_2, H_2 and CH_4 are taken in a container. The respective mole ratio of these gases in container is –
(A) 1: 16: 2 (B) 16: 1: 2
(C) 1: 2: 16 (D) 16: 2: 1

77. 5.6 litre of a gas at N.T.P. weighs equal to 8 gm. Vapour density of gas is –
(A) 32 (B) 16
(C) 8 (D) 40

78. Mol. wt. = vapour density × 2, is valid for -
(A) metals (B) non metals
(C) solids (D) gases

79. 2 moles of H_2 at NTP occupy a volume of
(A) 11.2 litre (B) 44.8 litre
(C) 2 litre (D) 22.4 litre

80. Number of Ca^{+2} and Cl^- ion in 111 g of anhydrous CaCl2 are –
(A) N_A, $2N_A$ (B) $2N_A$, N_A
(C) N_A, N_A (D) None

81. Out of 1.0 g dioxygen, 1.0 g (atomic) oxygen and 1.0 g of ozone, the maximum number of oxygen atoms are contained in –
(A) 1.0 g of atomic oxygen.
(B) 1.0 g of ozone.
(C) 1.0 g of oxygen gas
(D) All contain same number of atoms

82. The number of sodium atoms in 2 moles of sodium ferrocyanide $Na_4[Fe(CN)_6]$, is-
(A) 2 (B) 6.023×10^{23}
(C) $8 \times 6.02 \times 10^{23}$ (D) $4 \times 6.02 \times 10^{23}$

83. The total number of protons, electrons and neutrons in 12gm of ${}_6C^{12}$ is –
(A) 1.084×10^{25} (B) 6.022×10^{23}
(C) 6.022×10^{22} (D) 18

84. One mole of P_4 molecules contains –
(A) 1 molecule
(B) 4 molecules
(C) $1/4 \times 6.0^{22} \times 10^{23}$ atoms
(D) 24.088×10^{23} atoms

85. Total number of atoms present in 64 gm of SO_2 is –

(A) $2 \times 6.02 \times 10^{23}$ (B) 6.02×10^{23}

(C) $4 \times 6.02 \times 10^{23}$ (D) $3 \times 6.02 \times 10^{23}$

86. The total number of electrons present in 18 mL water (density 1 g/mL) is –

(A) 6.023×10^{23} (B) 6.023×10^{24}

(C) 6.023×10^{25} (D) 6.023×10^{21}

87. What is correct for 10 g of $CaCO_3$ –

(A) It contains 1g-atom of carbon

(B) It contains 0.3 g-atoms of oxygen

(C) It contains 12 g of calcium

(D) None of these

88. How many atoms are contained in a mole of $Ca(OH)_2$:

(A) $30 \times 6.02 \times 10^{23}$ atoms/mol

(B) $6 \times 6.02 \times 10^{23}$ atoms/mol

(C) 6.02×10^{23} atoms/mol

(D) $5 \times 6.02 \times 10^{23}$ atoms/mol

89. Which of the following contains the largest number of atoms –

(A) 11g of CO_2 (B) 4g of H_2

(C) 5g of NH_3 (D) 8g of SO_2

90. Mass of 1 atom of Hydrogen is –

(A) 1.66×10^{-24} g (B) 10^{-22} g

(C) 10^{-23} g (D) 10^{-25} g

ANSWERS KEY

46.	(B)	69.	(B)
47.	(A)	70.	(C)
48.	(D)	71.	(B)
49.	(C)	72.	(B)
50.	(C)	73.	(B)
51.	(A)	74.	(B)
52.	(C)	75.	(B)
53.	(B)	76.	(A)
54.	(B)	77.	(B)
55.	(C)	78.	(D)
56.	(D)	79.	(B)
57.	(A)	80.	(A)
58.	(A)	81.	(D)
59.	(C)	82.	(C)
60.	(A)	83.	(A)
61.	(C)	84.	(D)
62.	(A)	85.	(D)
63.	(B)	86.	(B)
64.	(A)	87.	(B)
65.	(C)	88.	(D)
66.	(B)	89.	(B)
67.	(C)	90.	(A)
68.	(B)		

HINTS & SOLUTIONS

46. (B)

$$P_C = \frac{a}{27b^2}$$

47. (A)

$$T_C = \frac{8a}{27Rb}$$

$$T_i = \frac{2a}{Rb},\ T_b = \frac{a}{Rb}$$

48. (D)

Greater the value of 'a'

Smaller the value of 'b'

Higher the critical temperature

$$T_C = \frac{8a}{27Rb}$$

49. (C)

H_2 gas is permanent gas shows positive deviation from ideal gas behavior.

50. (C)

$$b = L\,mol^{-1}$$

51. (A)

$$p_i = p + \frac{an^2}{V^2}$$

$$p_i - p = \frac{an^2}{V^2}$$

$$a = \frac{p'V^2}{n^2} \Rightarrow atmL^2mol^{-2}$$

52. (C)

FACTUAL

53. (B)

54. (B)

FACTUAL

55. (C)

$$p_i \propto \frac{n^2}{V^2} \quad \text{if } n=1$$

$$p_i \propto \frac{an^2}{V^2} \quad pi = \frac{a}{V^2}$$

56. (D)

FACTUAL

57. (A)

$$\frac{r_2}{r_1} = \sqrt{\frac{M_1}{M_2}}$$

58. (A)

K.E. = 3/2 n RT

(According to KTG)

59. (C)

FACTUAL

60. (A)

$$P_{O_2} = X_{O_2} \times P_T$$

$$Xo_2 = \frac{\eta o_2}{\text{Total moles}}$$

% V $\propto$ % n (Avogadro Law)

61. (C)

$P_{CH4} = X_{CH4} \times P_T$

62. (A)

Fact

63. (B)

H_2 and Cl_2 are reacting at room temperature.

64. (A)

Partial pressure of gas = $X_{gas}\ P_T$

65. (C)
V.D. = 70
MM= 70 × 2 = 140
140 = 28 × x
x =140/28 = 5
x = 5

66. (B)
Fact

67. (C)
Fact

68. (B)
$T_1 = 300$ K
$T_2 = 600$ K
$P_1 = P$
$P_2 = 2P$
$V_1 = 5L$
$V_2 = ?$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

69. (B)

$$d_A = 1.5d_B$$
$$M_A = M$$
$$d = \frac{PM}{RT} \Rightarrow \frac{d_A}{d_B} = \frac{M_A}{M_B}$$
$$\frac{1.5d_B}{d_B} = \frac{M}{M_B} = \frac{M}{1.5}$$

70. (C)

$$\frac{V(l)}{22.4} = \frac{W}{MM}$$

Molecular mass of gas helps to find out gas.

71. (B)

$$d = \frac{PM}{RT}$$

Fact

72. (B)
% N is $NH_2 - \underset{\underset{O}{\|}}{C} - NH_2$

$$\%\text{ of any Element} = \frac{\text{Atomic mass of element} \times \text{no. of atoms} \times 100}{\text{Mol. wt. of comp}}$$

73. (B)

$$d = 0.001293 \text{ gm/ml}$$
$$d = \frac{W}{V}$$
$$MM = 2 \times \text{V.D.}$$

74. (B)

$$W = 16g \quad V(l) = 5.6L$$
$$\frac{W}{MM} = \frac{V(l)}{22.4}$$
$$\frac{16}{MM} = \frac{5.6}{22.4}$$
$$MM = 64$$
$$= 32 + 16 \times x$$
$$x = 2$$

75. (B)

$$n_{H_2O} = \frac{W}{MM} \times 2$$
$$= \frac{488}{244} \times 2 = 4$$

76. (A)

$$n = \frac{W}{MM}$$

O_2		H_2		CH_4
$\frac{W}{32}$	:	$\frac{W}{2}$	:	$\frac{W}{16}$
$\Rightarrow 1$	:	16	:	2

77. (B)

$$\frac{V(l)}{22.4} = \frac{W}{MM}$$
$$MM = 2 \times \text{V.D.}$$

78. (D)
FACT

79. (B)
$n = \frac{V(l)}{22.4}$
$V(l) = 2 \times 22.4 = 44.8\ L$

80. (A)
$\frac{N_0}{N_A} = \frac{W}{MM}$
$\Rightarrow$ No. of Ca^{+2} ion $= \frac{111}{111} \times N_A \times 1 = N_A$
$\Rightarrow$ No. of Cl^- ions $= \frac{111}{111} \times N_A \times 2 = 2N_A$

81. (D)
$\frac{N_0}{N_A} = \frac{W}{MM}$

82. (C)
n = 2
$n = \frac{N_0}{N_A}$
$N_0 = 2 \times N_A \times 4$
$= 8 \times 6.02 \times 10^{23}$

83. (A)
W = 12 gm
$^{12}C_6$ = Atomic no = 6
No. of e^- = 6
No. of protons = 6
No. of neutrons = 12 – 6 = 6
$\frac{N_0}{N_A} = \frac{W}{A.M.}$
No. of protons, $e^{\ominus}$ & neutrons $= \frac{12}{12} \times N_A \times 18$

84. (D)
$n = \frac{N_0}{N_A}$
No. of molecules $= N_A$
No. of atoms $= 4N_A$
$= 4 \times 6.02 \times 10^{23}$

85. (D)
$\frac{N_0}{N_A} = \frac{W}{MM}$
$N_0 = \frac{64}{64} \times N_A \times 3$
$= 3 \times 6.02 \times 10^{23}$

86. (B)
$\frac{N_0}{N_A} = \frac{W}{MM}$
$d = \frac{W}{MM} = W = d \times V$
$= 1 \times 18$
$= 18\ g$
$N_0 = \frac{18}{18} \times N_A \times 10$
$= 6.02 \times 10^{24}$

87. (B)
$n = \frac{W}{MM} = \frac{10}{100} = 0.1$ mole
g – atom = mole
g – atom of 'O' $= \frac{10}{100} \times 3 = 0.3$

88. (D)
$n = \frac{N_0}{N_A}$
$N_0 = 1 \times N_A \times 5$
$= 5N_A$

89. (B)

$$\frac{N_0}{N_A} = \frac{W}{MM}$$

i $N_0 = \frac{11}{44} \times N_A \times 3$

$= \frac{3}{4} N_A$

ii $N_0 = \frac{4}{2} \times N_A \times 2$

$= 4 N_A$

iii $N_0 = \frac{5}{17} \times N_A \times 4$

$= \frac{20}{17} N_A$

iv $N_0 = \frac{8}{64} \times N_A \times 3$

$= \frac{3}{8} N_A$

90. (A)

$$\frac{N_0}{N_A} = \frac{W}{A.M.}$$

$$\frac{N_0}{N_A} \times A.M. = W$$

$$W = \frac{1}{6.02 \times 10^{23}}$$

$$= 1.66 \times 10^{-24}$$