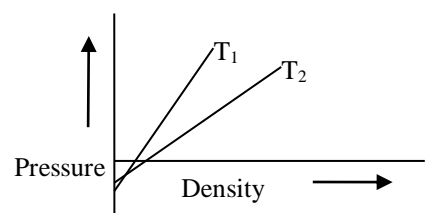


6. The volume of gas is 100ml at 100°C. If pressure remains same then at what temperature it will be 200ml?
(A) 200°C (B) 473°C (C) 746°C (D) 50°C
7. A gas cylinder containing cooking gas can withstand a pressure of 14.9 atm. The pressure gauge of cylinder indicates 12 atm at 27°C. Due to sudden fire in building the temperature starts rising. The temperature at which the cylinder will explode is.
(A) 42.5°C (B) 67.8°C (C) 99.5°C (D) 25.7°C

Ideal Gas Law

8. Flasks A and B of equal size contain 2 gm of H₂ and 2 gm of N₂ respectively at the same temperature. The number of molecules in flask A is
(A) Same as those in flask B (B) Less than those in flask B
(C) Greater than those in flask B (D) Exactly half of those in flask B
9. 3.2g S on heating if occupy a volume of 780 ml at 450°C and 723 mm pressure. Formula of sulphur is:
(A) S₂ (B) S (C) S₄ (D) S₈
10. The volume of balloon filled with 4.0g He at 22°C and 720 mm of Hg is
(A) 25.565 L (B) 20 L (C) 15 L (D) 30 L
11. Two containers A and B contain the same gas. If the pressure, volume and absolute temperature of the gas in A are twice as compared to that of gas in B, and if the mass of the gas B is x g, the mass of gas in A is
(A) x g (B) 4x g (C) 2/x g (D) 2x g
12. What is the final temperature if a sample of ammonia gas, initially at a pressure of 3.00 atm, a temperature of 500K, and a volume of 275L is changed to a volume of 200L and a pressure of 2.50atm?
(A) 303K (B) 436K (C) 573K (D) 825K
13. 5.40 gm of an unknown gas at 27°C occupies the same volume as 0.14 gm of hydrogen at 17°C and same pressure. The molecular weight of unknown gas is
(A) 79.8 (B) 81 (C) 79.2 (D) 83
14. Which of the following gases would have the largest density at 25°C and 1.00 atm pressure?
(A) Methane, CH₄ (B) Acetylene, C₂H₂ (C) Ethylene, C₂H₄ (D) Propane, C₃H₈
15. To expel half the mass of air from a large flask at 27°C, it must be heated to:
(A) 54°C (B) 177°C (C) 277°C (D) 327°C

16. An open vessel containing air is heated from 300 K to 400 K. The fraction of air originally present which goes out of it is:
 (A) $\frac{3}{4}$ (B) $\frac{1}{4}$ (C) $\frac{2}{3}$ (D) $\frac{1}{8}$
17. 0.2 mole sample of hydrocarbon C_xH_y yields after complete combustion with excess O_2 gas, 0.8 mole of CO_2 , 1.0 mole of H_2O . Hence hydrocarbon is
 (A) C_4H_{10} (B) C_4H_8 (C) C_4H_5 (D) C_8H_{16}
18. If the pressure of a given mass of gas is reduced to half and temperature is doubled simultaneously then the volume will be
 (A) Same as before (B) Twice as before (C) $\frac{1}{4}$ the as before (D) None
19. The 1 mol of an Ideal gas A with 300 mm of Hg is separated by 2 mol of another ideal gas B with 300 mm of Hg in closed container at the same temperature. If the separation is removed than total pressure is
 (A) 200 mm of Hg (B) 300 mm of Hg (C) 500 mm of Hg (D) 600 mm of Hg
20. Assume centre of sun to consist of gases whose average molecular weight is 2. The density and pressure of the gas are 1.3 g cc^{-1} and $1.12 \times 10^9 \text{ atm}$ respectively. The temperature of sun is
 (A) $2 \times 10^3 \text{ K}$ (B) $2 \times 10^5 \text{ K}$ (C) $2 \times 10^7 \text{ K}$ (D) $2 \times 10^9 \text{ K}$
21. 6 g each of the following gases at 87°C and 750 mm pressure are taken. Which of them will have the least volume
 (A) HF (B) HCl (C) HBr (D) HI
22. The density of O_2 gas at 25°C is 1.458 mg/lit at one atm pressure. At what pressure will O_2 have the density twice the value?
 (A) $0.5 \text{ atm}/25^\circ\text{C}$ (B) $2 \text{ atm}/25^\circ\text{C}$ (C) $4 \text{ atm}/25^\circ\text{C}$ (D) none
23. The density of neon gas is highest at
 (A) STP (B) 0°C , 2 atm (C) 273°C , 1 atm (D) 273°C , 2 atm
24. Figure shows graphs of pressure versus density for an ideal gas at two temperatures T_1 and T_2 . Which is correct?
- 
- (A) $T_1 > T_2$ (B) $T_1 = T_2$ (C) $T_1 < T_2$ (D) none of these
25. Equal masses of three ideal gases X, Y and Z are mixed in a sealed rigid container. If the temperature of the system remains constant, which of the following statements about the partial pressure of gas X is correct?

- (A) It is equal to $1/3$ the total pressure
 (B) It depends on the intermolecular forces of attraction between molecule of X, Y and Z.
 (C) It depends on the relative molecular masses of X, Y and Z.
 (D) It depends on the average distance travelled between molecular collisions.

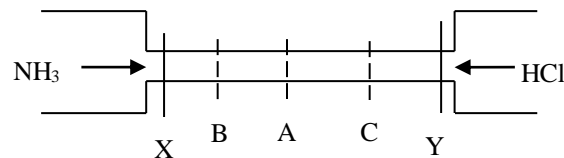
Dalton's Law Of Partial Pressure

26. When 2g gas A is introduced into an evacuated flask kept at 25°C , the pressure is found to be 1 atm. If 3g of another gas B is further added to same flask, the total pressure becomes 1.5 atm. The ratio of molecular weights is
 (A) 1:1 (B) 1:2 (C) 1:3 (D) 1:4
27. Air contains 79 % N_2 and 21 % O_2 by volume. If the barometric pressure is 750 mm Hg. The partial pressure of oxygen is
 (A) 157.5 mmHg (B) 175.5 mmHg (C) 315.0 mmHg (D) none
28. A gaseous mixture contains 1g of H_2 , 4g of He, 7g of N_2 and 8g of O_2 . The gas having the highest partial pressure is
 (A) H_2 (B) O_2 (C) He (D) N_2
29. A mixture consisting of 0.10 moles of N_2 , 0.05 moles of O_2 and 0.20 moles of CH_4 and an unknown amount of CO_2 occupied a volume of 9.6 L at 27°C and 1.0 atm pressure. How many moles of CO_2 are there in this sample ?
 (A) 0.04 mol (B) 0.39 mol (C) 0.05 mol (D) 0.10 mol

Graham's Law

30. X ml of H_2 gas effuses through a hole in a container in 5 secs. The time taken for effusion of same volume of gas specified below under identical condition is
 (A) 10 secs : He (B) 20 secs : O_2 (C) 25 secs : CO (D) 55 secs : CO_2
31. Which of the following pair will diffuse at the same rate?
 (A) CO_2 and N_2O (B) CO_2 and NO (C) CO_2 and CO (D) N_2O and NO
32. A mixture of H_2 and O_2 in 2:1 volume is allowed to diffuse through a porous partition what is the composition of gas coming out initially
 (A) 1:2 (B) 4:1 (C) 8:1 (D) 1:4

33. The valves X and Y in the adjoining figure are opened simultaneously. The white fumes of NH_4Cl will first formed at
 (A) A (B) B
 (C) C (D) A, B and C simultaneously



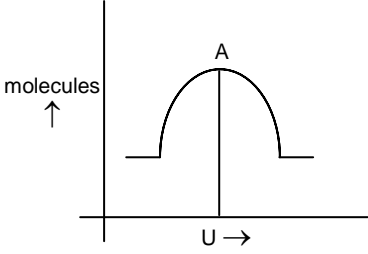
34. The pair of gases which can be most easily separated from effusion technique
 (A) D_2 and H_2 (B) CH_4 and CD_4 (C) $C^{12}H_4$ and $C^{14}H_4$ (D) $U^{235}F_6$ and $U^{238}F_6$
35. The rate of diffusion of methane at a given temperature is twice that of gas X. The molecular weight of X is:
 (A) 64.0 (B) 32.0 (C) 4.0 (D) 8.0
36. Which of the following mixture of gases cannot be separated by diffusion method
 (A) $NO + C_2H_6$ (B) $NO + NO_2$
 (C) $CO + CO_2$ (D) $C_2H_4 + C_2H_6$
37. Bromine vapour at a given temperature is roughly 5 times denser than oxygen gas. Calculate the relative rates at which $Br_2(g)$ and $O_2(g)$ diffuse.
 (A) O_2 should diffuse roughly 2.2 times faster.
 (B) Br_2 should diffuse roughly 2.2 times faster.
 (C) O_2 should diffuse roughly 5.0 times faster.
 (D) Br_2 should diffuse roughly 5 times faster.
38. A balloon filled with moist air has developed a pinhole. It is quickly plunged into a tank of dry air at the same pressure. In a short while
 (A) It will collapse (B) It will enlarge
 (C) No change will take place (D) can't be predicted
39. Some moles of SO_2 diffuse through a small opening in 20 seconds. Same number of moles of an unknown gas diffuses through the same opening in 60 seconds. Molecular mass of the unknown gas is
 (A) $(64)^2 \times \left(\frac{60}{20}\right)$ (B) $(64)^2 \times \left(\frac{20}{60}\right)$
 (C) $(64) \times \left(\frac{60}{20}\right)^2$ (D) $(64) \times \left(\frac{20}{60}\right)^2$
40. Vegetables are canned, while they are steaming hot because
 (A) the heat inside will seal the jars
 (B) the heat increases the atmospheric pressure
 (C) the heat creates more pressure inside the jars
 (D) when the jars cool, a vacuum inside will help to seal the jars

Eudiometry

41. 200 ml of a gaseous mixture containing CO, CO₂ and N₂ on complete combustion in just sufficient amount of O₂ showed contraction of 40 ml when the resulting gases were passed through KOH solution it reduces by 50% then calculate the volume ratio of V_{CO₂} : V_{CO} : V_{N₂} in original mixture.
 (A) 4: 1: 5 (B) 2: 3: 5 (C) 1 : 4 : 5 (D) 1 : 3: 5
42. 10 ml of a compound containing 'N' and 'O' is mixed with 30 ml of H₂ to produce H₂O (l) and 10 ml of N₂ (g). Molecular formula of compound if both reactants reacts completely, is
 (A) N₂O (B) NO₂ (C) N₂O₃ (D) N₂O₅
43. One mole mixture of CH₄ & air (containing 80% N₂ 20% O₂ by volume) of a composition such that when underwent combustion gave maximum heat (assume combustion of only CH₄). Then which of the statements are correct, regarding composition of initial mixture.(X presents mole fraction)
 (A) $X_{CH_4} = \frac{1}{11}, X_{O_2} = \frac{2}{11}, X_{N_2} = \frac{8}{11}$ (B) $X_{CH_4} = \frac{3}{8}, X_{O_2} = \frac{1}{8}, X_{N_2} = \frac{1}{2}$
 (C) $X_{CH_4} = \frac{1}{6}, X_{O_2} = \frac{1}{6}, X_{N_2} = \frac{2}{3}$ (D) Data insufficient
44. A mixture of C₂H₂ and C₃H₈ occupied a certain volume at 80 mm Hg. The mixture was completely burnt to CO₂ and H₂O(l). When the pressure of CO₂ was found to be 230 mm Hg at the same temperature and volume, the fraction of C₂H₂ in mixture is
 (A) 0.125 (B) 0.5 (C) 0.85 (D) 0.25

Kinetic Theory of Gases

45. If E_k is the average kinetic energy per mole of a gas, then
 (A) $PV = \frac{3}{2} E_k$ (B) $P = \frac{3}{2} VE_k$
 (C) $PV = \frac{2}{3} E_k$ (D) $3 PV = E_k$
46. The kinetic energy of a mole of ideal gas in calories is approximately equal to
 (A) 3 times its absolute temperature
 (B) 2 times its absolute temperature
 (C) 4 times its absolute temperature
 (D) 2/3 times its absolute temperature

47. A sample of gas is at 0°C . The temperature at which rms speed of the molecule will be doubled is
 (A) 103°C (B) 273°C (C) 723°C (D) 819°C
48. The temperature at which H_2 has same rms speed (at 1 atm) as that of O_2 at NTP is
 (A) 37 K (B) 17 K (C) 512 K (D) 27 K
49. In a closed vessel, a gas is heated from 300 K to 600 K the kinetic energy becomes/remains
 (A) half (B) double (C) same (D) four times
50. Which of the following gases would have the highest rms speed at 0°C
 (A) O_2 (B) CO_2 (C) SO_3 (D) CO
51. The ratio of rms velocity to average velocity of gas molecules at a particular temperature is
 (A) 1.086 : 1 (B) 1 : 1.086 (C) 2 : 1.086 (D) 1.086 : 2
52. On increasing temperature, the fraction of total gas molecule which has acquired most probable velocity will
 (A) Increase (B) decrease
 (C) Remains constant (D) cant say without knowing pressure
53. Distribution of molecules with velocity is represented by the curve. Point A in the curve shifts to the higher value of velocity if
 (A) T is increased
 (B) V is increased
 (C) P is increased
 (D) All
- 
54. The K.E. of N molecule of O_2 is x Joules at -123°C . Another sample of O_2 at 27°C has a KE of 2x Joules. The latter sample contains.
 (A) N molecules of O_2 (B) 2N molecules of O_2
 (C) N/2 molecules of O_2 (D) N/4 molecule of O_2
55. The ratio between the rms velocity of H_2 at 50 K and that of O_2 at 800 K is
 (A) 4 (B) 2 (C) 1 (D) 1/4
56. Let the most probable velocity of hydrogen molecules at a temp $t^{\circ}\text{C}$ is V_0 . Suppose all the molecules dissociate into atoms when temp is raised to $(2t + 273)^{\circ}\text{C}$ then the new r.m.s velocity is
 (A) $\sqrt{2/3} V_0$ (B) $\sqrt{3(2 + 273/t)} V_0$ (C) $2\sqrt{3} V_0$ (D) $\sqrt{6} V_0$

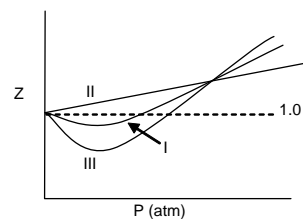
57. An ideal gas molecule is present at 27°C. By how many degree centigrade its temperature should be raised so that its V_{rms} , V_{mp} and V_{av} all may double.
 (A) 900°C (B) 108°C (C) 927°C (D) 81°C
58. If most probable speed is represented by m_p and fraction of molecules possessing this speed by f , then with increase in temperature
 (A) both m_p and f will increase (B) m_p will increase but f will decrease
 (C) Both will decrease (D) m_p will decrease but f will increase
59. Which of the following statements concerning the kinetic theory of gases is (are) correct?
 I. Molecules make elastic collisions with each other and with the walls of their container.
 II. The average kinetic energy of a large number of molecules of mass, M , is proportional to $M^{1/2}$ at a given temperature.
 III. The molecules of a gas are in constant random motion.
 IV. All the molecules of a gas have the same kinetic energy at a given temperature.
 (A) I,II,III,IV (B) I,II,III (C) I,III,IV (D) I,III
60. The root mean square speed of CH_4 molecules at 25°C is about 0.56 km/s. What is the root mean square speed of a H_2 molecule at 25°C?
 (A) 0.070 km/s (B) 0.20 km/s (C) 1.1 km/s (D) 1.6 km/s
61. Assume that the container is filled with the mixture of SO_3 and Ne. The molecular weight of SO_3 is 80 g/mol and the atomic weight of Ne is 20 g/mol. The average velocity of an SO_3 molecules is
 (A) One fourth that of a Ne atom (B) One half that of a Ne atom
 (C) The same as a Ne atom (D) Two times that of a Ne atom
62. Consider two 1 L flasks, one containing O_2 , the other containing He, each at STP. Which of the following statement is NOT true regarding these gases?
 (A) Each flask contains the same number of atom or molecule
 (B) The gases in each flask have the same average kinetic energy.
 (C) The gases in each flask have the same density.
 (D) The pressure in each flask is the same.
63. Compare the root mean square speed of an O_2 molecule with that of CH_4 molecule at the same temperature and pressure.
 (A) The speed are the same, since the weight of O_2 and of CH_4 are both 16 g/mol
 (B) The speed are the same because at the same temperature all gas molecules have the same mean square speed.
 (C) CH_4 is 2.00 times faster, because the MW of O_2 is times greater than the molecular weight of CH_4 .

- (D) CH_4 is 1.41 times faster, since at equal temperature of all gas molecules have the same kinetic energy. Square root mean square speed then is inversely proportional to the square root of the molecular weight.
64. The kinetic molecular theory of gases predicts pressure to rise as the temperature of a gas increases because
- The average kinetic energy of the gas molecules decreases
 - Gas molecules collide more frequently with the container walls
 - Gas molecules collide less frequently with the container walls
 - Gas molecules collide less energetically with the container walls
65. "The higher the temperature of a gas at constant volume, the greater is its pressure." Which of the following kinetic molecular explanations of this principle is not correct
- Molecule move faster at higher temperatures
 - The number of molecular impacts per unit area decreases at a higher temperature.
 - The average kinetic energy of molecules is greater at a higher temperature.
 - The average momentum and rate of molecular collisions is greater at a higher temperature.
66. A certain gas is at a temperature of 350 K. If the temperature is raised to 700K, the average translational kinetic energy of the gas will
- Remains constant
 - Increase by a factor of 2
 - Increase by a factor of square root of 2
 - Decrease by a factor of square root of 2
67. Identify a postulate of Kinetic theory among the following
- An atom is indivisible
 - Gases combine in simple ratio
 - There is no influence of gravity on gas molecules
 - None of the above
68. Molecular velocities of two gases at the same temperature are U_1 and U_2 and their molecular masses are m_1 and m_2 respectively. Which of the following expression is correct
- $\frac{m_1}{U_1^2} = \frac{m_2}{U_2^2}$
 - $m_1 U_1 = m_2 U_2$
 - $\frac{m_1}{U_1} = \frac{m_2}{U_2}$
 - $m_1 U_1^2 = m_2 U_2^2$
69. If P is the pressure of gas, then the kinetic energy per unit volume of the gas is
- $P/2$
 - P
 - $3P/2$
 - 2P

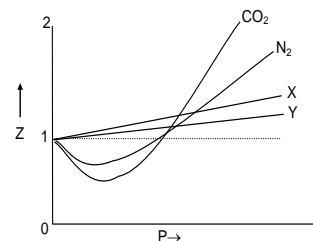
70. If the absolute temperature of a sample of gas in a fixed volume container is quadrupled, then the root mean square speed in the initial state u_i and that in the final stage u_f would be related as:
 (A) $u_f = u_i/4$ (B) $u_f = u_i/2$ (C) $u_f = 2u_i$ (D) $u_f = 4u_i$
71. Consider the following statement about Maxwell Boltzmann law of distribution of molecular speeds:
 1) The fraction of molecules having speed between c and $(c + dc)$ (regardless of direction) is given by $4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} c^2 \exp\left(-\frac{Mc^2}{2RT}\right) dc$
 2) The average speed is the arithmetic mean of the different speeds of all the molecules present in a given sample of the gas.
 3) The speed distribution curve becomes sharper and is more peaked at higher temperature as the average speed increases.
 4) The speed distribution function is used to determine average molecular speeds.
 of these statements:
 (A) 1, 2 and 3 are correct (B) 1, 2 and 4 are correct
 (C) 1,3 and 4 are correct (D) 2, 3 and 4 are correct

Compressibility Factor

72. The compressibility factor for an ideal gas is
 (A) 1.5 (B) 1 (C) 2 (D) ∞
73. The compressibility factor of He as a real gas at room temperature is
 (A) Unity (B) $1 - \frac{a}{RTV}$ (C) $1 + \frac{Pb}{RT}$ (D) $\frac{RTV}{1-a}$
74. For a non-zero volume of molecules having no force of attraction, the variation of compressibility factor, Z vs P is best represent by
 (A) I (B) II
 (C) III (D) All the above

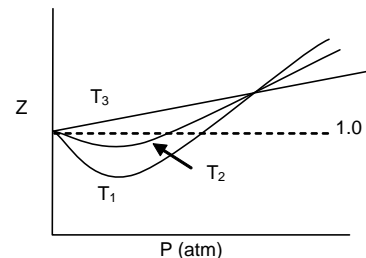


75. In a given diagram gas X and Y can be
 (A) Hydrogen and Helium (B) Helium and Hydrogen
 (C) Hydrogen and Neon (D) Helium and Neon



76. The plot of Z vs P for N_2 gas at different temperature is shown, correct order of the temperature T_1 , T_2 and T_3 is

- (A) $T_1 > T_2 > T_3$ (B) $T_1 < T_2 > T_3$
 (C) $T_1 < T_2 < T_3$ (D) $T_1 = T_2 = T_3$



Van der Waal's gas equation

77. For non-zero value of force of attraction between gas molecules gas equation will be

- (A) $PV = nRT - \frac{n^2a}{V}$ (B) $PV = nRT + nbP$ (C) $PV = nRT$ (D) $P = \frac{nRT}{V - b}$

78. Out of the following gases, which one has least value of Vander Waals constant 'a'

- (A) CO_2 (B) NH_3 (C) CH_4 (D) H_2

79. The value of Vander Waals constant 'a' is maximum for

- (A) Helium (B) nitrogen (C) CH_4 (D) NH_3

80. Which of the following statement is true for Van der waals gas constant 'a' and 'b'?

- (A) 'a' depends on size and shape, 'b' depends only on size of molecule.
 (B) 'b' depends on size and shape, 'a' depends only on size of molecule.
 (C) Both 'a' and 'b' depends on shape and size of molecule.
 (D) Both 'a' and 'b' depends only on size of molecule.

81. Table gives values of 'a' for different gases

O_2	H_2	NH_3	CH_4
1.310	1.390	4.17	2.253

Therefore which can most easily liquefied is

- (A) O_2 (B) NH_3 (C) H_2 (D) CH_4

82. Identify the conditions of pressure and temperature at which a real gas shows maximum deviation from ideal behavior:

- (A) 10 atm, 273 K (B) 5 atm, 273 K (C) 10 atm, 373 K (D) 5 atm, 373 K

83. a/V^2 given in van der Waals equation is for:

- (A) internal pressure (B) intermolecular attraction
 (C) both 1 and 2 (D) temperature correction.

84. Which of the following statement is not true ?

- (A) The pressure of the real gas is equal to the pressure calculated for an ideal gas.
 (B) The van der Waals' equation helps to calculate the pressure and volume of real gases

- (C) Real gas molecules do occupy a finite, but small, volume.
(D) None of these

85. The compressibility factor for gas obeying van der Waals' equation of state is given by (where \bar{V} is molar volume)

(A) $\frac{\bar{V}}{\bar{V}-b} - \frac{a}{RT\bar{V}}$ (B) $\frac{a}{RT\bar{V}} - \frac{\bar{V}}{\bar{V}-b}$ (C) $\frac{\bar{V}-b}{\bar{V}} - \frac{RT\bar{V}}{a}$ (D) $\frac{RT\bar{V}}{a} - \frac{\bar{V}-b}{\bar{V}}$

Virial Gas Equation and Liquefaction of gas

86. One way of writing the equation of state for one mole of real gas

$$PV = RT \left[A + \frac{B}{V} + \frac{C}{V^2} + \dots \right]$$

Where A, B and C may be constants or dependent variables.

1. A is temperature dependent, and higher terms B, C.....are temperature independent.
2. A is temperature independent, and higher terms B, C.....are temperature dependent.
3. At Boyle's temperature, A is unity and B, C....are negligible.
4. At Boyle's temperature, all terms A, B, C....are negligible.

Select the correct statements

- (A) 1, 4 (B) 2, 3 (C) 1, 3 (D) 2, 4

87. The temperature at which a real gas obeys the ideal gas laws at fairly wide range of pressure is

- (A) Critical temperature (B) Inversion temperature
(C) Boyle's temperature (D) Reduced temperature

88. The compressibility factor $Z = \frac{PV}{nRT}$ of a gas above $T = \frac{a}{Rb}$ will be

- (A) Always less than Unity (B) Always equal to unity
(C) Always greater than Unity (D) Depends on pressure

89. A given gas cannot be liquefied if its temperature is

- (A) equal to its critical temperature (B) greater than its critical temperature
(C) smaller than its critical temperature (D) equal to its inversion temperature

90. Which of the following gases is the least likely to behave ideally?

- (A) He (B) N₂ (C) HCl (D) H₂

91. At moderate pressure, the compressibility factor for a particular gas is given by:

$Z = 1 + 0.34p - \frac{160p}{T}$ (p in bar and T in kelvin). What is the Boyle's temperature of this gas?

- (A) 298K (B) 340K (C) 470K (D) 680K

92. A gas can be liquefied most suitably at:

- (A) $T = T_c$ and $P < P_c$ (B) $T < T_c$ and $P = P_c$
 (C) $T < T_c$ and $P > P_c$ (D) $T > T_c$ and $P > P_c$

93. NH_3 gas is liquefied more easily than N_2 . Hence:

- (A) Van der Waals' constant a and b of $\text{NH}_3 >$ than of N_2
 (B) Van der Waals' constant a and b of $\text{NH}_3 <$ that of N_2
 (C) $a(\text{NH}_3) > a(\text{N}_2)$ but $b(\text{NH}_3) < b(\text{N}_2)$
 (D) $a(\text{NH}_3) < a(\text{N}_2)$ but $b(\text{NH}_3) > b(\text{N}_2)$

- | | | |
|-------|-------|-------|
| 1. C | 23. B | 46. A |
| 2. A | 24. A | 47. D |
| 3. C | 25. C | 48. B |
| 4. A | 26. C | 49. B |
| 5. A | 27. A | 50. D |
| 6. B | 28. C | 51. A |
| 7. C | 29. A | 52. B |
| 8. C | 30. B | 53. A |
| 9. D | 31. A | 54. A |
| 10. A | 32. C | 55. C |
| 11. D | 33. C | 56. D |
| 12. A | 34. A | 57. A |
| 13. A | 35. A | 58. B |
| 14. D | 36. A | 59. D |
| 15. D | 37. A | 60. D |
| 16. B | 38. A | 61. B |
| 17. A | 39. C | 62. C |
| 18. D | 40. D | 63. D |
| 19. B | 41. C | 64. B |
| 20. C | 42. C | 65. B |
| 21. D | 43. A | 66. B |
| 22. B | 44. A | 67. C |
| | 45. C | 68. D |

- 69. C
- 70. C
- 71. B
- 72. B
- 73. C
- 74. B
- 75. A
- 76. C
- 77. A
- 78. D
- 79. D
- 80. A
- 81. B
- 82. A
- 83. B
- 84. A
- 85. A
- 86. B
- 87. C
- 88. C
- 89. B
- 90. C
- 91. C
- 92. C
- 93. C