

# QB365 Question Bank Software Study Materials

## Gaseous State 50 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Chemistry

Total Marks : 50

### Multiple Choice Question

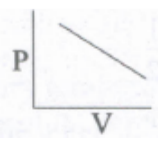
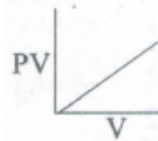
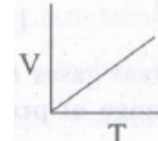
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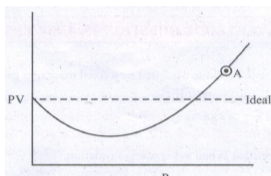
- 1) Gases deviate from ideal behavior at high pressure. Which of the following statement(s) is correct for non-ideality?
- (a) at high pressure the collision between the gas molecule become enormous  
(b) at high pressure the gas molecules move only in one direction (c) at high pressure, the volume of gas become insignificant  
**(d) at high pressure the intermolecular interactions become significant**
- 2) Rate of diffusion of a gas is \_\_\_\_\_
- (a) directly proportional to its density (b) directly proportional to its molecular weight  
(c) directly proportional to its square root of its molecular weight  
**(d) inversely proportional to the square root of its molecular weight**
- 3) Which of the following is the correct expression for the equation of state of van der Waals gas?
- (a)  $\left(P + \frac{a}{n^2V^2}\right)(V - nb) = nRT$  (b)  $\left(P + \frac{na}{n^2V^2}\right)(V - nb) = nRT$  **(c)  $\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$**   
(d)  $\left(\frac{P+n^2a^2}{V^2}\right)(V - ab) = nRT$
- 4) When an ideal gas undergoes unrestrained expansion, no cooling occurs because the molecules \_\_\_\_\_
- (a) are above inversion temperature **(b) exert no attractive forces on each other**  
(c) do work equal to the loss in kinetic energy (d) collide without loss of energy
- 5) Equal weights of methane and oxygen are mixed in an empty container at 298 K. The fraction of total pressure exerted by oxygen is \_\_\_\_\_
- (a)  $\frac{1}{3}$**  (b)  $\frac{1}{2}$  (c)  $\frac{2}{3}$  (d)  $\frac{1}{3} \times 273 \times 298$
- 6) The temperatures at which real gases obey the ideal gas laws over a wide range of pressure is called \_\_\_\_\_ -
- (a) Critical temperature **(b) Boyle temperature** (c) Inversion temperature (d) Reduced temperature
- 7) A bottle of ammonia and a bottle of HCl connected through a long tube are opened simultaneously at both ends. The white ammonium chloride ring first formed will be \_\_\_\_\_
- (a) At the center of the tube **(b) Near the hydrogen chloride bottle** (c) Near the ammonia bottle  
(d) Throughout the length of the tube
- 8) The value of universal gas constant depends upon \_\_\_\_\_
- (a) Temperature of the gas (b) Volume of the gas (c) Number of moles of the gas **(d) units of Pressure and volume.**
- 9) The value of the gas constant R is \_\_\_\_\_
- (a) 0.082 dm<sup>3</sup> atm. (b) 0.987 cal mol<sup>-1</sup>K<sup>-1</sup> **(c) 8.3 J mol<sup>-1</sup> K<sup>-1</sup>** (d) 8 erg mol<sup>-1</sup> K<sup>-1</sup>
- 10) Use of hot air balloon in sports at meteorological observation is an application of \_\_\_\_\_
- (a) Boyle's law** (b) Newton's law (c) Kelvin's law (d) Brown's law
- 11) The table indicates the value of van der Waals constant 'a' in (dm<sup>3</sup>)<sup>2</sup> atm. mol<sup>-2</sup>.

Gas	O <sub>2</sub>	N <sub>2</sub>	NH <sub>3</sub>	CH <sub>4</sub>
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a	1.360	1.390	4.170	2.253
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The gas which can be most easily liquefied is \_\_\_\_\_

- (a) O<sub>2</sub> (b) N<sub>2</sub> **(c) NH<sub>3</sub>** (d) CH<sub>4</sub>
- 12) Consider the following statements  
 i) Atmospheric pressure is less at the top of a mountain than at sea level  
 ii) Gases are much more compressible than solids or liquids  
 iii) When the atmospheric pressure increases the height of the mercury column rises.  
 Select the correct statement  
 (a) I and II (b) II and III (c) I and III **(d) I, II and III**
- 13) If temperature and volume of an ideal gas is increased to twice its values, the initial pressure P becomes \_\_\_\_\_  
 (a) 4P (b) 2P **(c) P** (d) 3P
- 14) At identical temperature and pressure, the rate of diffusion of hydrogen gas is  $3\sqrt{3}$  times that of a hydrocarbon having molecular formula C<sub>n</sub>H<sub>2n-2</sub>. What is the value of n ?  
 (a) 8 **(b) 4** (c) 3 (d) 1
- 15) Equal moles of hydrogen and oxygen gases are placed in a container, with a pin-hole through which both can escape what fraction of oxygen escapes in the time required for one-half of the hydrogen to escape.  
 (a)  $\frac{3}{8}$  (b)  $\frac{1}{2}$  **(c)  $\frac{1}{8}$**  (d)  $\frac{1}{4}$
- 16) The variation of volume V, with temperature T, keeping pressure constant is called the coefficient of thermal expansion ie  $\alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_P$  For an ideal gas  $\alpha$  is equal to \_\_\_\_\_  
 (a) T **(b) 1/T** (c) P (d) none of these
- 17) Four gases P, Q, R and S have almost same values of 'b' but their 'a' values (a, b are Vander Waals Constants) are in the order Q < R < S < P. At a particular temperature, among the four gases the most easily liquefiable one is \_\_\_\_\_  
**(a) P** (b) Q (c) R (d) S
- 18) Maximum deviation from ideal gas is expected from \_\_\_\_\_  
 (a) CH<sub>4</sub>(g) **(b) NH<sub>3</sub> (g)** (c) H<sub>2</sub> (g) (d) N<sub>2</sub> (g)
- 19) The units of Vander Waals constants 'b' and 'a' respectively \_\_\_\_\_  
 (a) mol L<sup>-1</sup> and L atm<sup>2</sup> mol<sup>-1</sup> (b) mol L and L atm mol<sup>2</sup> **(c) mol<sup>-1</sup>L and L<sup>2</sup> atm mol<sup>-2</sup>** (d) none of these
- 20) Assertion: Critical temperature of CO<sub>2</sub> is 304K, it can be liquefied above 304K.  
 Reason : For a given mass of gas, volume is to directly proportional to pressure at constant temperature  
 (a) both assertion and reason are true and reason is the correct explanation of assertion  
 (b) both assertion and reason are true but reason is not the correct explanation of assertion  
 (c) assertion is true but reason is false **(d) both assertion and reason are false**
- 21) What is the density of N<sub>2</sub> gas at 227° C and 5.00 atm pressure? (R = 0.082 L atm K<sup>-1</sup> mol<sup>-1</sup> )  
 (a) 1.40 g/L (b) 2.81 g/L **(c) 3.41 g/L** (d) 0.29 g/L
- 22) Which of the following diagrams correctly describes the behaviour of a fixed mass of an ideal gas? (T is measured in K)  
 (a)  (b)  **(c) ** (d) All of these
- 23) 25g of each of the following gases are taken at 27°C and 600 mm Hg pressure. Which of these will have the least volume?  
 (a) HBr (b) HCl (c) HF **(d) HI**

- 24) Compressibility factor for CO<sub>2</sub> at 400 K and 71.0 bar is 0.8697 the molar volume of CO<sub>2</sub> under these conditions \_\_\_\_\_  
 (a) 22.04 dm<sup>3</sup> (b) 2.24 dm<sup>3</sup> (c) **0.41 dm<sup>3</sup>** (d) 19.5 dm<sup>3</sup>
- 25) In a closed room of 1000 m<sup>3</sup> a perfume bottle is opened up. The room develops smell. This is due to which property of gases \_\_\_\_\_  
 (a) Viscosity (b) Density (c) **Diffusion** (d) None
- 26) The standard atmospheric pressure is the pressure that supports a column of mercury exactly \_\_\_\_\_ high at 0° C at sea level.  
 (a) 760mm (b) 76 cm (c) **both a & b** (d) 760 cm
- 27) Compression factor Z is given by \_\_\_\_\_  
 (a) **PV/nRT** (b) P/nRT (c) PV/R (d) PV/T
- 28) If 'Z' is a compressibility factor, Vander waals equation at low pressures can be written as \_\_\_\_\_  
 (a)  $Z = 1 + \frac{Pb}{RT}$  (b)  $Z = 1 + \frac{RT}{Pb}$  (c)  **$Z = 1 - \frac{a}{VRT}$**  (d)  $Z = 1 - \frac{Pb}{RT}$
- 29) The isotherm obtained for CO is as follows:  
  
 The compressibility factor for the gas at point 'A' will be \_\_\_\_\_  
 (a)  $(1 - \frac{b}{V})$  (b)  **$(1 + \frac{b}{V})$**  (c)  $(1 + \frac{b}{RT})$  (d)  $(1 + \frac{a}{RTV})$
- 30) The average kinetic energy of the gas molecule is \_\_\_\_\_.  
 (a) inversely proportional to its absolute temperature (b) **directly proportional to its absolute temperature**  
 (c) equal to the square of its absolute temperature (d) All of the above
- 31) With rise in temperature, the surface tension of a liquid \_\_\_\_\_.  
 (a) **decreases** (b) increases (c) remaining the same (d) none of the above
- 32) Viscosity of a liquid is a measure of \_\_\_\_\_.  
 (a) repulsive forces between the liquid molecules (b) **frictional resistance**  
 (c) intermolecular forces between the molecules (d) none of the above
- 33) The cleansing action of soaps and detergents is due to \_\_\_\_\_.  
 (a) internal friction (b) high hydrogen bonding (c) viscosity (d) **surface tensions**
- 34) In Van der Waals equation of state for a non-ideal gas the net force of attraction among the molecules is given by \_\_\_\_\_.  
 (a)  **$\frac{an^2}{V^2}$**  (b)  $P + \frac{an^2}{V^2}$  (c)  $P - \frac{an^2}{V^2}$  (d)  $-\frac{an^2}{V^2}$
- 35) Which of the following gases will have the lowest rate of diffusion?  
 (a) H<sub>2</sub> (b) N<sub>2</sub> (c) **F<sub>2</sub>** (d) O<sub>2</sub>
- 36) The instrument used for measuring the atmospheric pressure is \_\_\_\_\_.  
 (a) lactometer (b) **barometer** (c) electrometer (d) ammeter
- 37) The value of Universal gas constant in a ideal gas equation is equal to \_\_\_\_\_.  
 (a) 8.314 KJ (b) **0.082057 dm<sup>3</sup> atm mol<sup>-1</sup>K<sup>-1</sup>** (c) 1 Pascal (d) 8.314 x 10<sup>-2</sup> Pascal
- 38) The value of critical volume is equal in terms of Vander Waals constant is \_\_\_\_\_.  
 (a) **3b** (b)  $\frac{8a}{27Rb}$  (c)  $\frac{a}{27b^2}$  (d)  $\frac{2a}{Rb}$

- 39) The value of critical pressure of  $\text{CO}_2$  is \_\_\_\_\_.
- (a) 173 atm    **(b) 73 atm**    (c) 1 atm    (d) 22.4 atm
- 40) The temperature produced in adiabatic process of liquefaction is \_\_\_\_\_.
- (a) zero Kelvin    (b) -273 K    **(c)  $10^{-4}$  K**    (d)  $10^4$  K
- 41) The value of Vander Waals constant "a" is maximum for \_\_\_\_\_.
- (a) helium    (b) nitrogen    (c) methane    **(d) ammonia**
- 42) **Statement-I:** Gases do not liquefy above their critical temperature, even on applying high pressure.  
**Statement-II:** Above critical temperature, the molecular speed is high and intermolecular attractions cannot hold the molecules together because they escape because of high speed.
- (a) Statement-I and II are correct and Statement-II is the correct explanation of Statement-I**
- (b) Statement-I and II are correct but Statement-II is not the correct explanation of Statement-I
- (c) Statement-I is correct but Statement-II is wrong    (d) Statement-I is wrong but Statement-II is correct
- 43) In a closed flask of 5 litres, 1.0 g of  $\text{H}_2$  is heated from 300 to 600 K, which statement is not correct?
- (a) pressure of the gas increases    (b) the rate of the collision increase    **(c) the number of moles of gas increases**
- (d) the energy of gaseous molecules increases
- 44) Consider the following statements.
- (i) All the gases have higher densities than liquids and solids.  
(ii) All gases occupy zero volume at absolute zero.  
(iii) At very low pressure all gases exhibit ideal behaviour.
- Which of the above statement is/are not correct?
- (a) (i) only**    (b) (ii) only    (c) (iii) only    (d) (ii) and (iii) only
- 45) Which law is used in the process of enriching the isotope of  $\text{U}^{235}$  from other isotopes?
- (a) Boyle's law    (b) Dalton's law of partial pressure    **(c) Graham's law of diffusion**    (d) Charles' law
- 46) When the pressure and absolute temperature of 5 L nitrogen are doubled, the gas would have a volume of \_\_\_\_\_.
- (a) 10 L    **(b) 5 L**    (c) 15 L    (d) 20 L
- 47) The unit of Vanderwaal constants 'a' is \_\_\_\_\_.
- (a)  $\text{dm}^6 \text{ atm mol}^{-2}$**     (b)  $\text{dm}^3 \text{ atm mol}^{-1}$     (c)  $\text{dm atm mol}^{-1}$     (d)  $\text{atm.mol}^{-1}$
- 48) At same temperature and pressure, the rate of diffusion of hydrogen gas is  $3\sqrt{3}$  times that of a hydrocarbon having molecular formula  $\text{C}_n \text{H}_{2n-2}$ . The value of n is \_\_\_\_\_.
- (a) 3    (b) 2    (c) 6    **(d) 4**
- 49) The liquefaction methods are based on \_\_\_\_\_.
- (a) Joule - Thomson effect**    (b) Inductive effect    (c) Resonance effect    (d) None
- 50) The minimum pressure required to liquify 1 mole of a gas at its critical temperature is called \_\_\_\_\_.
- (a) critical pressure**    (b) critical volume    (c) critical temperature    (d) none