Chapter Test 5	**PARISHRAM PUBLICATIONS PUNE** **NAME of Student : _____** **Subject : Chemistry** **Class : XI** **Max. Marks :- 180** **Topic : States of Matter Gases and Liquids**	

NEET CHAPTER TEST

Marking Scheme:

(i) Each question is allotted 4 (four) marks for each correct response.

(ii) ¼ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

Q.1 Calculate average speed and RMS speed for a group of six particles having speeds 11.2, 9.0, 8.3, 6.5, 3.7 and 1.8m sec^{-1}

(1) 6.75 ms^{-1}, 7.47 ms^{-1}

(2) 7.47 ms^{-1}, 6.75 ms^{-1}

(3) 7.65 ms^{-1}, 8.47 ms^{-1}

(4) None of these

Q.2 A gas occupies 300 ml at 27ºC and 730 mm pressure. What would be its volume at STP-

(1) 162.2 ml (2) 262.2 ml

(3) 362.2 ml (4) 462.2 ml

Q.3 A truck carrying oxygen cylinders is filled with oxygen at –23ºC and at a pressure of 3 atmosphere in Srinagar, Kashmir. Determine the internal pressure when the truck drives through Madras. Tamilnadu. Where the temperature is 30ºC –

(1) 2.64 atm. (2) 1.64 atm.

(3) 1 atm. (4) 3.64 atm.

Q.4 A 10 g of a gas at atmospheric pressure is cooled from 273°C to 0°C keeping the volume constant, its pressure would become

(1) 1/2 atm (2) 1/273 atm

(3) 2 atm (4) 273 atm

Q.5 Two grams of hydrogen diffuse from a container in 10 minutes. How many grams of oxygen would diffuse through the same container in the same time under similar conditions

(1) 0.5 g (2) 4 g

(3) 6 g (4) 8 g

Q.6 If the v_{rms} is $30R^{1/2}$ at 27°C then calculate the molar mass of gas in kilogram.

(1) 1 (2) 2

(3) 4 (4) 0.001

Q.7 The Vander Waal's parameters for gases W, X, Y and Z are

Gas	a (atm L^2 mol^{-2})	b (L mol^{-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

(1) W (2) X

(3) Y (4) Z

Q.8 If for two gases of molecular masses M_A and M_B at temperature T_A and T_B, $T_AM_B = T_BM_A$, then which of the following properties has the same magnitude for both the gases –

(1) Pressure (2) Density

(3) Molar K.E. (4) rms speed

Q.9 If the rms speed of nitrogen and oxygen molecule are same at two different temperature and same pressure then choose the incorrect statement –

(1) Average speed of molecule is also same.

(2) Density (gm/litre) of nitrogen and oxygen is also equal.

(3) Number of moles of each gas is also equal.

(4) Most probable speed of molecules is also equal.

Q.10 A balloon filled with an ideal gas shrinks when cooled. When shrinking is done, which property will remain same as it was originally –

(1) The rms speed of gas molecules

(2) The pressure in the balloon

(3) The density of gas

(4) The kinetic energy of gas particles

Q.11 The number of moles per litre in the equation PV = nRT is expressed by -

(1) P/RT (2) PV/RT

(3) RT/PV (4) None

Q.12 The correct value of R is -

(1) R = 0.082 litre-atm

(2) R = 8.314×10^7 erg-K^{-1} mol^{-1}

(3) R = 2 K^{-1} mol^{-1}

(4) None of these

Q.13 According to the kinetic theory of gases, in an ideal gas, between two successive collisions a gas molecule travels

(1) In a straight line path

(2) With an accelerated speed

(3) In a circular path (4) In a wavy path

Q.14 As the temperature is raised from 20°C to 40°C, the average kinetic energy of neon atoms changes by a factor of which of the following ?

(1) 1/2 (2) $\sqrt{(313/293)}$

(3) 313/293 (4) 2

Q.15 In van der Waals equation of state of the gas law, the constant 'b' is a measure of –

(1) intermolecular repulsions

(2) intermolecular attraction

(3) volume occupied by the molecules

(4) intermolecular collisions per unit volume

Q.16 Which one of the following statements is not true about the effect of an increase in temperature on the distribution of molecular speeds in a gas ?

(1) The fraction of the molecules with the most probable speed increases.

(2) The most probable speed increases.

(3) The area under the distribution curve remains the same as under the lower temperature.

(4) The distribution becomes broader

Q.17 Equal masses of methane and oxygen are mixed in an empty container at 25ºC. The fraction of the total pressure exerted by oxygen is –

(1) 2/3 (2) $\frac{1}{3}\times\frac{273}{298}$

(3) 1/3 (4) 1/2

Q.18 If 10^{-4} dm^3 of water is introduced into a 1.0 dm^3 flask to 300 K, how many moles of water are in the vapour phase when equilibrium is established ? (Given : Vapour pressure of H_2O at 300 K is 3170 Pa ; R = 8.314 J K^{-1} mol^{-1})

(1) 5.56×10^{-3} mol (2) 1.53×10^{-2} mol

(3) 4.46×10^{-2} mol (4) 1.27×10^{-3} mol

Q.19 a and b are van der Waals' constants for gases. Chlorine is more easily liquefied than ethane because

(1) a and b for Cl_2 > a and b for C_2H_6

(2) a and b for Cl_2 < a and b for C_2H_6

(3) a and Cl_2 < a for C_2H_6 but b for Cl_2 > b for C_2H_6

(4) a for Cl_2 > a for C_2H_6 but b for Cl_2 < b for C_2H_6

Q.20 The compressibility factor for a real gas at high pressure is

(1) 1 + RT/Pb (2) 1

(3) 1 + Pb /RT (4) 1 – Pb/RT

Q.21 For gaseous state, if most probable speed is denoted by C*, average speed by and root mean square speed by C, then for a large number of molecules the ratios of these speeds are:

(1) C* : $\overline{C}$: C = 1.225 : 1.128 : 1

(2) C* : $\overline{C}$: C = 1.128 : 1.225 : 1

(3) C* : $\overline{C}$: C = 1 : 1.128 : 1.225

(4) C* : $\overline{C}$: C = 1 : 1.225 : 1.128

Q.22 If Z is a compressibility factor, van der Waals equation at low pressure can be written as –

(1) $Z = 1 - \frac{Pb}{RT}$ (2) $Z = 1 + \frac{Pb}{RT}$

(3) $Z = 1 + \frac{RT}{Pb}$ (4) $Z = 1 - \frac{a}{VRT}$

Q.23 Molar volume of CO_2 is maximum at

(1) NTP (2) 0°C and 2.0 atm

(3) 127°C and 1 atm (4) 273°C & 2.0 atm.

Q.24 1 L flask contains nitrogen along with few drop of water at 40°C, the total pressure being 760 torr. If all the contents are transferred to another flask of 0.5 L at the same temperature, the pressure set up in the second flask will be (aqueous tension at 40°C = 55 torr)

(1) 1410 torr (2) 1465 torr

(3) 1520 torr (4) none of these.

Q.25 Vapour pressure increases with increase in

(1) concentration of solution containing non-volatile solute.

(2) temperature upto boiling point

(3) temperature upto triple point

(4) altitude of the concerned place of boiling

Q.26 The pressure of a mixture of equal weights of two gases of molecular weight 4 and 40, is 1.1 atm. The partial pressure of the lighter gas in this mixture is –

(1) 0.55 atm (2) 0.11 atm

(3) 1 atm (4) 0.1 atm

Q.27 A gaseous mixture is the mixture of 2 moles of A and 3 moles of B. Total pressure of the mixture is 5 atm. What is the partial pressure of A and B respectively?

(1) 2 atm and 4 atm (2) 2 atm and 3 atm

(3) 3 atm and 2 atm (4) 6 atm and 2 atm

Q.28 The molecules of a gas A travel four times faster than the molecules of gas B at same temperature. The ratio of molecular weights (M_A/M_B) will be

(1) 1/16 (2) 4 (3) 1/4 (4) 1/16

Q.29 At very low pressures, the compressibility factor of CO_2 having constant value of molar volume

(1) increases with increase in temperature.

(2) decreases with increase in temperature.

(3)remains constant with change in temperature

(4) is one

Q.30 Cooking is fast in a pressure cooker, because –

(1) food particles are effectively smashed.

(2) water boils at low temperature inside the pressure cooker.

(3) food is cooked at constant volume.

(4) loss of heat due to radiation is minimum.

Q.31 48 litre of dry N_2 is passed through 36 g H_2O at 27°C and this results in a loss of 1.20 g of water. The vapour pressure of water is
(1) 1.03 atm (2) 0.021 atm
(3) 0.034 atm (4) 0.66 atm

Q.32 Equal masses of methane and hydrogen are mixed in an empty container at 25°C. The fraction of the total pressure exerted by hydrogen is
(1) 1/2 (2) 8/9
(3) 1/9 (4) 16/17

Q.33 NH_3 and HCl gas are introduced simultaneously from the two ends of a long tube. A white ring of NH_4Cl appears first –
(1) nearer to the HCl end
(2) at the centre of the tube
(3) throughout the tube
(4) nearer to the NH_3 end

Q.34 The mass of molecule A is half the mass of molecule B whereas the rms speed of A is twice the rms speed of B. If two samples of A and B contain same number of molecules, what will be the ratio of pressure of A to that of B in samples in separate containers of equal volume?
(1) 8 (2) 4
(3) 2 (4) 1/2

Q.35 The surface tension of which of the following liquid is maximum –
(1) C_2H_5OH (2) CH_3OH
(3) H_2O (4) C_3H_6

Q.36 If a gas expands at constant temperature, it indicates that:
(1) Number of the molecules of gas increases
(2) Kinetic energy of molecules decreases
(3) Pressure of the gas increases
(4) Kinetic energy of molecules remains the same

Q.37 Volume occupied by one molecule of water (density = 1g cm^{-3}) is :
(1) 5.5×10^{-23} cm^3 (2) 9.0×10^{-23} cm^3
(3) 6.023×10^{-23} cm^3 (4) 3.0×10^{-23} cm^3

Q.38 The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-19} J and bond energy per molecule is 4.0×10^{-19} J. The kinetic energy of the molecule per atom will be:
(1) 2.2×10^{-19} J (2) 2.0×10^{-19} J
(3) 4.0×10^{-20} J (4) 2.0×10^{-20} J

Q.39 A vessel of volume 0.02 m^3 contains a mixture of hydrogen and helium at 20°C and 2 atm pressure. The mass of mixture is 5 gms. Find the ratio of mass of hydrogen to that of helium in the mixture (At. wt. He = 4)
(1) 1 : 2 (2) 1 : 3
(3) 2 : 3 (4) 3 : 2

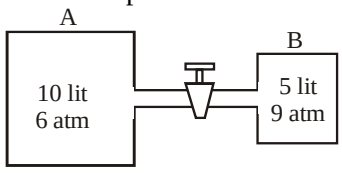
Q.40 The average, RMS and most probable speed of gas molecules at STP increase in the order
(1)RMS < average speed < most probable speed
(2)Most probable speed< average speed < RMS
(3)Average speed< RMS < most probable speed
(4) RMS< most probable speed < average speed

Q.41 Equal volumes of SO_2 and He at a temperature T and pressure P are allowed to effuse through a hole. The rate of effusion of helium is
(1) Equal to the rate of effusion of SO_2
(2) Four times the rate of effusion of SO_2
(3) Half of the rate of effusion of SO_2
(4) Twice the rate of effusion of SO_2

Q.42 Flask X is filled with 20g of CH_4 gas at 100°C and another identical flask Y with 40g O_2 gas at the same temperature. Which one of the following statements is correct – [Molar masses (g mol^{-1}) CH_4 = 16.0, O_2 = 32.0]
(1) The pressure of the gases in the two flasks are identical.
(2) The pressure of CH_4 in flask X is higher than that of O_2 in flask Y.
(3) The pressure of CH_4 in flask X is lower than that of O_2 in flask Y.
(4) The pressure of CH_4 in flask X is half that of O_2 in flask Y.

Q.43 The rate of effusion of helium gas at a pressure of 1000 torr is 10 torr min^{-1}. What will be the rate of effusion of hydrogen gas at a pressure of 2000 torr at the same temperature?
(1) 20 torr min^{-1} (2) 40 torr min^{-1}
(3) 20 torr min^{-1} (4) 10 torr min^{-1}

Q.44 The stop cock connecting the two bulbs of volume 5 litre and 10 litre containing as ideal gas at 9 atm and 6 atm respectively, is opened. What is the final pressure if the temperature remains same.



(1) 5 atm. (2) 4 atm.
(3) 7 atm. (4) 3 atm

Q.45 Oxygen is present in 1-litre flask at a pressure of 7.6×10^{-10} mmHg. Calculate the number of oxygen molecules in the flask at 0ºC.
(1) 2.686×10^{10} (2) 26.86×10^{10}
(3) 0.626×10^{12} (4) 4.123×10^{8}