Provincial department of education,
Northern province

Monthly Evaluation

Grade – 12	Chemistry	July – 2022

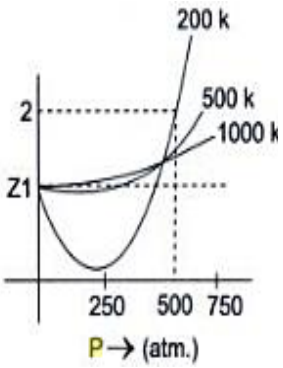
Part -1 (Select the most suitable answer)

1. What is the relative molecular mass of a 2.5 g mass of a gas at 1.48 dm^3 volume and 1atm pressure?
   42.84 2. 43.45 3. 43.92 4.44.48 5. 44.96

2. In which instance real gas obey PV = nRT eqation|?
   1. At high temperature and high pressure
   2. At Low temperature and low pressure
   3. At low temperature and high pressure
   4. At high temperature and low pressure
   5. None of the above

3. Which statement is true regarding the kinetic molecular theory of gases?
   1. Real gas always has the point mass
   2. When the temperature is increases, the number of molecules with less than the high probability speed will decrease.
   3. Kinetic energy of molecules is directly proportional to T^2.
   4. Kinetic energy of molecules isdirectly proportionl to $\sqrt{T}$.
   5. None of the above statement is not true.

4. Below graph shows the variation of compressibility factor (Z) vs pressure(P) of $N_2(g)$ at different temperature .



   1. Graph A is for ideal gas
   2. Boyle's temperature of N2(g) (TB) is found as 200K< TB <1000K
   3. At low pressure $N2_{(g)}$ reach the ideal behavior
   4. Total attractive force is found always between the N2(g) molecules
   5. N2(g) shows ideal behavior at point X, where the graph A and B intercept .

5. Incorrect statement regarding the gases at normal temperature and presuure?
    1. Have compressibility.
    2. Volume and shape is the container's volume and shape
    3. Exert different amount of pressure in the wall of the container
    4. Solid has the low density compared with liquid.
    5. Shows random motion

6. A balloon is filled at an atmospheric pressure (100 kPa) by a gas. how much volume should expand to become 3.0 dm^3 volume and 20 kpa pressure at the same temperature?
    1. 3/5 2.5/3 3.1.5 4.15 5.3

7. What is the root mean square speed of $N_2(g)$ at 77 ^oC in ms^{-1}?
    1. 1.77×10^{-1} 2. 3.12×10^2 3. 5.58×10^2 4. 7.89×10^2 5. 5.12×10^5

8. At 100 ^oC a particular gas molecules have the average speed 600 ms^{-1}, then in which instance the average speed becomes 1200 m s^{-1}?
    1. volume is increased by 4 times
    2. pressure becomes half
    3. temperature is increased to 200^oC
    4. temperature is increased to 400^oC
    5. temperature is increased to 1200^oC

9. Which statement is correct regarding the gases?
    1. In all instances real gas obey ideal gas equation
    2. For real gas compressibility factor (Z) will never becomes 1.
    3. Volume of 1 mol of $CH_{4(g)}$ at 7^oC and 5×10^5 Pa pressure is 4.656 dm^3
    4. Due to attractive force between the real gas molecules ,decreases the pressure of real gas.
    5. Average kinetiv energy of a gas is directly proportionl to temperature.

10. $O_{2(g)}$ is prepared in laboratory by heating $kClO_{3(S)}$

    $2KClO_{3(s)} \longrightarrow 2KCl_{(s)} + 3O_{2(g)}$

    if the volume of $_{O2(g)}$ collected above the water at 27 ^oC and 760torr is 1.8 dm^3 .then what is the mol of $O_{2(g)}$ collected (vopour pressure of water at 27 ^oC is 26.7 torr)
    1. 70.55 2.0.058 3.0.071 4.0.548 5.5.48

(1)	(2)	(3)	(4)	(5)
Only a and b are correct	Only b and c are correct	Only c and d are correct	Only a and d are correct	Other response /s is/ are correct

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11. Which is /are correct statement/s regarding the $\overline{C^2}$ in the kinetic molecular theory of ideal gas?
    a) $\overline{C^2}$ increases with temperature
    b) At constant temperature when the molar mass of gas increases ,$\overline{C^2}$ will decrese.
    c) $\overline{C^2}$decreses when density of gases increases.
    d) Foe any gas at same temperature $\overline{C^2}$ is equal.

12. Which is /are correct statement/s
    a. Real gas can be liquify but ideal gas cann't be liquefy.
    b. If same mass of $H_2(g)$ and $O_2(g)$ is in a container will exert same pressure.
    c. Average kinetic energy of He(g) has double than the average kinetic energy of $H_2(g)$ at same conditions.
    d. Density of CO and N_2 is same at same temperature and pressure

13. Which is /are correct statement/s regarding an ideal gas?
    1. Molecular kinetic equation of ideal gas is $PV=1/3mN\overline{C^2}$
    2. Ideal gas constant R=8.314Nmmol-1
    3. PV of a particular mass of ideal gas at constant temperature is constant.
    4. V/T of a particular mass of ideal gas at constant temperature is constant.

14. Which is /are incorrect statement/s?
    1. Thermal energy of a body arise due to movement of molecules.
    2. At same temperature and pressure ,same volume of gases have the same number of molecules.
    3. High temperature is disadvantage to ideal gas.
    4. When temperature of ideal gas is constant ,then the volume become constant.

15. Which is /are correct statement/s regarding the real gases?
    1. Some real gases react chemically between molecules.
    2. PV/nRT doesn't change with temperature.
    3. For a particular mass of a gas PV doesn't change with pressure.
    4. Different real gas has different boiling point

	Statement 1	Statement 2
16)	For a particular mass of a gas at constant temperature PV is always constant.	For any gas when the pressure is increased then volume will decresed
17)	A molecule of ideal gas has the same kinetic energy before and after the collision between tha wall.	Average kinetic energy of real gas is only depend on absorbed temperature
18)	At high pressure and low temperature real gas mre deviate with ideal gas.	Rteal gas molecule has low volume compared with volume

		of ideal gas.
19)	For real gas at low pressure we cann't use vanderwaal's eqution	Real gas obey ideal behavior at low pressure
20)	Critical temperature of NH_3 (g)is higher than CO_2 (g)	Strength iof attractive force between NH3 molecule is greater than the attractive force between CO_2.

Structured essay

Answer all questions in this paper

01) At constant pressure and temperature He and Ne gas is found in a fixed volume of a vessel has cross sectional area A and length l.

i. If total pressure is P_1 derive an expression for total number of moles N_T

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ii) if temperature of vessel is increased by 2 times, then the pressure is P_2.derive an expression for P_2 interms of P_1?

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iii) draw a Boltzmann distribution curve for a gas (He or Ne) at a temperature.

iv)Explain the extent of the above graph

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b) $F_2(g)$ and Xe (g) samples are mixed in a constant volume of avessel. Before the reaction partial pressure of each component are $8x\ 10^{-5}$ kPa and $1.7x10^{-5}$ kPa respectively. and all Xe (g) are reacted and forms a solid component. Then the partial pressure of $F_{2(g)}$ is $4.67\ x10^5$ kPa.

i) if the reaction occurs at constant temperature deduce the chemical formula of the solid component**.**

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ii) At 300 K mean square speed of two gasesA and B are $2.4x10^5$ and $3.2x10^6$ respectively .molar mass of mass of A is 32 $gmol^{-1}$. What is the molar mass of B?

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iii) at constant temperature a gas mixture contains 40% He,15% H_2 ,25% N_2 and remaining Ne by volume percentage. Calculate the pressure of the system and partial pressure of each component?

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Essay (Answer all questions)

01) a). i) Derive Dalton partial pressure law by using ideal gas equation?

ii) deduce the kinetic energy of gases is only depend on absolute temperature using kinetic molecular theory equation?

iii) Give the vanderwaal' s equation of real gss?

b). A vessel A of volume 8.314 dm^3 at 300 K contains He gas at $3x10^5\ Nm^{-2}$ pressure and vessel B of volume 16.628 dm^3 at 127 K contains Ne gas at pressure $4\ x10^5\ Nm^{-2}$.

(Ne-20, He-4)

i) Calculate the number of moles of He and Ne?

ii) Calculate density of He and Ne?

iii) If both vessels are connected by a negligible volume of wire and then the temperature of the system is maintained at 27 ^{o}C,then calculate the total pressure?

iv) Calculate the partial pressure of Ne (g) in vessel A at 27 ^{O}C?

v) If the temperature of the system after connecting is increased to 400 K what is the total pressure?

c) $NH_{3\,(g)}$and N_2H_4 (g) is compressed in a vessel and the total p[ressure of the vessel is $0.5x10^5$ Pa .when the temperature of the system is increased to 1200 K ,both gases are fully decomposed.

$2NH_{3(g)} \longrightarrow N_{2(g)} + 3H_{2(g)}$

$N_2H_{4(g)} \longrightarrow N_{2(g)} + 2H_{2(g)}$

After the decomposition total pressure is $4.5x10^5$ Pa. Calculate the mole percentage of N_2H_4(g) (assume both gases behave ideally)