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Calculate the standard enthalpy of formation of $PCl_3(g)$ in kJ/mol

$1/2\ P_4(s) + 3\ Cl_2(g) \rightarrow 2\ PCl_3(g) \qquad \Delta H = -639.4\ kJ$

Note: most stable form of P element is $P_4(s)$.

Select one:

- a. 0.00
- b. -287.0
- c. -213.1
- d. -319.7
- e. -639.4

Q1 $\Delta H(PCl_3(g)) - \frac{1}{2} - 3 = -619.4$

$$\frac{2X}{2} = -\frac{639.4}{2}$$

$$X = \Delta H(PCl_3(g))$$

$$= -319.7 \text{ KJ/mol}$$

ERAL CHEMISTRY I/ جميع الشعب

A mixture of gases contains 4.7 mol of N_2 gas and 2.7 mol of Ar gas. If the total pressure of the mixture was 2.8 atm, what would be the partial pressure of N_2 (in atm.) ?

Select one:

- a. 0.64
- b. 1.0
- c. 1.4
- d. 2.8
- e. 1.8

Q3

$n N_2 = 4.7$ mol

$n Ar = 2.7$ mol

$P_{Tot} = 2.8$ atm

$X N_2 = \frac{4.7}{(4.7 + 2.7)}$

$X N_2 = .635$

$P N_2 = X P_{tot}$

$P N_2 = 0.635 * 2.8$

$P N_2 = 1.78 \simeq 1.8$ atm

Question 5

Not yet answered

Marked out of 1.5

Flag question

What is the enthalpy (in kJ) of the following reaction at constant pressure?

$CH_4(g) + NH_3(g) \rightarrow HCN(g) + 3H_2(g)$

Use the following thermochemical equations:

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$ $\Delta H = -91.8$ kJ

$C(graphite) + 2H_2(g) \rightarrow CH_4(g)$ $\Delta H = -74.9$ kJ

$H_2(g) + 2C(graphite) + N_2(g) \rightarrow 2HCN(g)$ $\Delta H = +270.3$ kJ

Select one:

- a. -301.9
- b. +164.2
- c. +103.6
- d. +253.3
- e. +256.0

Qs

1) $CH_4 \longrightarrow C + 2H_2$ $\quad \Delta H_1 = 74.9$

2) $NH_3 \longrightarrow \frac{3}{2} H_2 + \frac{1}{2} N_2$ $\quad \Delta H_2 = 45.9$

3) $\frac{1}{2} H_2 + C + \frac{1}{2} N_2 \rightarrow HCN$ $\quad \Delta H_3 = 135.15$

$$CH_4 + NH_3 = HCN + 3H_2$$

$$\Delta H = \Delta H_1 + \Delta H_2 + \Delta H_3$$

$$\Delta H = 256.0$$

A 0.590 gram of volatile liquid was vaporized at 95 °C and expanded in 200 ml flask at 800 mmHg. Calculate the molar mass of this liquid in g/mol.

R = 0.082 atm.L/mol.K or 8.314 $kg \cdot m^2/s^2 \cdot K \cdot mol$

Select one:

- a. 84.9
- b. 68.1
- c. 73.0
- d. 60.7
- e. 78.1

Q6 $PV = \frac{m}{M.w} RT$

$$M.w = \frac{mRT}{PV}$$

$$M.w = \frac{.590\ g * 10.082 * (96 + 273.15)}{1.053\ atm * .22}$$

$$\boxed{Mw = 84.8\ g/mol}$$

AL CHEMISTRY I/ جميع الشعب

The volume of certain amount of nitrogen at 23°C and 746 mmHg is 10.1 cm^3 . What is the volume of nitrogen at 25 °C and 820 mmHg ?

Select one:

- a. 9.99
- b. 0.894
- c. 10.2
- d. 11.0
- e. 9.25

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$V_1 = 10.1\ cm^3$ $T_1 = 23 + 273$

$\rightarrow 10.1 * 10^{-3}\ l$ $= 296\ K^\circ$

$P_1 = 746\ mmHg * \frac{1atm}{760\ mmHg} = .982\ atm$

2

$V_2 = ??$ $T_2 = 298\ K^\circ$

$P_2 = 820\ mmHg * \frac{1atm}{760\ mmHg} = 1.079\ atm$

Sol —

$$\frac{P_1 V_1}{T_1 n_1} = \frac{P_2 V_2}{T_2 n_2}$$

$$\frac{.982 * 10.1 * 10^{-3}}{296} = \frac{1.079\ V_2}{298}$$

$$\boxed{V_2 = 9.25\ l}$$

Calculate the rms speed (in m/s) of He (molar mass = 4.0 g/mol) molecules in a cylinder at 27 °C and 8.7 atm.

R = 0.082 atm.L/mol.K or 8.314 $kg \cdot m^2/s^2 \cdot K \cdot mol$

Select one:

- a. 406.0
- b. 136.0
- c. 1367.7
- d. 12.8
- e. 42.8

Question 8

Find Urms in m/s

He molar mass = 4 g/mol

$\rightarrow 4 * 10^{-3}$ Kg/mol

T = 27c°

= 300 K°

$$U_{rms} = \sqrt{\frac{3RT}{M.m}}$$

$$= \sqrt{\frac{3 * 300 * .0821}{4 * 10^{-3}}} \approx 136 \text{ m/s}$$

Which of the following statements is incorrect according to the molecular kinetic theory?

Select one:

- a. Gas molecules frequently collide with one another by inelastic collisions. ✔
- b. Gases are composed of molecules whose size is negligible compared with the average distance between them.
- c. Gas molecules exert neither attractive nor repulsive forces on one another.
- d. Gas molecules are in constant motion in random directions.
- e. The average kinetic energy of the molecules is proportional only to the temperature of the gas in kelvins.

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NERAL CHEMISTRY I/ جميع الشعب

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The work done when a gas is compressed in a cylinder is 366 J. During this process, there is a heat transfer of 173 J from the gas to the surroundings. Calculate the energy change for this process (in J).

Select one:

- a. +539 ✔
- b. -539
- c. +193
- d. +732
- e. -193

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Finish attempt

Question 1

Not yet answered

Marked out of 2.00

Flag question

According to the following reaction, what volume of 0.244 M KCl solution is required to react exactly with 50.0 ml of 0.210 M $Pb(NO_3)_2$ solution?

$$2\,KCl(aq) + Pb(NO_3)_2(aq) \rightarrow PbCl_2(s) + 2\,KNO_3(aq)$$

Answer: 21.51

Question 2

Not yet answered

Marked out of 3.00

Flag question

At what temperature in K would O_3 (48.00 g/mole) molecules have a root mean square speed (rms) equal to that of O_2 (32.00 g/mole) molecules at 236 K?

Answer: 536

Q1:-

$$2KCl + Pb(NO_3)_2 \rightarrow PbCl_2 + 2KNO_3$$

- $V(KCl) = ?$, $[KCl] = .244\,M$,
  $V(Pb(NO_3)_2) = 50.0 \times 10^{-3}\ L$, $[Pb(NO_3)_2] = .210\,M$

Solution:-

$$M = \frac{n_{solute}}{V_{sol'}} \rightarrow n(Pb(NO_3)_2) = .210 \times 50.0 \times 10^{-3}$$

$$= .011\ mol$$

$$.011\ mol\ of\ Pb(NO_3)_2 \times \frac{2\ mol\ of\ KCl}{1\ mol\ of\ Pb(NO_3)_2}$$

$$= .022\ mol\ of\ KCl$$

$$V(KCl) = \frac{.022\ mol}{.244\ \frac{mol}{L}} = .090\ L$$

Question 2

Not yet answered

Marked out of 3.00

Flag question

At what temperature in K would O_3 (48.00 g/mole) molecules have a root mean square speed (rms) equal to that of O_2 (32.00 g/mole) molecules at 236 K?

Answer:

Question 3

Predict the precipitate in the following reaction:

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Q2:- $T(O_3) = ?$ in K, have equal μ_{rms} of O_2 at $T = 236$ K

$M_\omega = 48.0 \frac{g}{mol}$

Solution:-

$$\mu_{rms} = \sqrt{\frac{3RT}{M_\omega \times 10^{-3}}}$$

* hint:- 10^{-3} to convert from g → kg

$$\text{for } O_2 = \sqrt{\frac{3(8.314)(236)}{32.0 \times 10^{-3}}} = 428.9 \frac{m}{s}$$

so, $\mu_{rms}(O_3) = 428.9 \frac{m}{s}$

$$\left(\mu_{rms}(O_3)\right)^2 = \frac{3RT}{M_\omega \times 10^{-3}}$$

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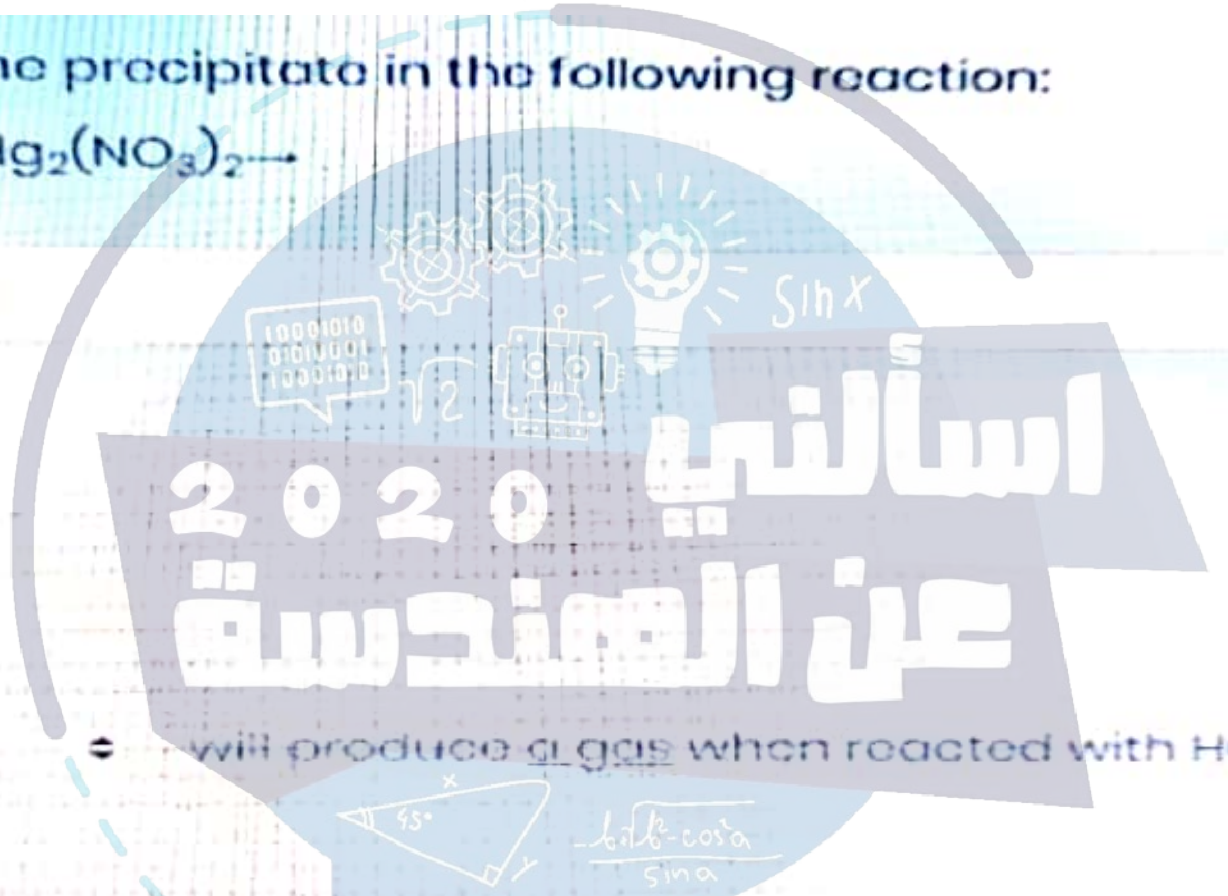
$$(428.9)^2 = \frac{3(8.314)T}{.048}$$

$$T = 354.0 \text{ K}$$

Predict the precipitate in the following reaction:

$CaCl_2 + Hg_2(NO_3)_2 \longrightarrow$

Answer:



KOH ⇔ will produce a gas when reacted with HCl

Question 7

Not yet answered

Marked out of 2.00

Flag question

At what **temperature in °C** will a fixed amount of gas with a volume of 197 L at 15°C and 760 mmHg occupy a volume of 198 L at a pressure of 640 mm Hg?

Answer:

Finish attempt ...

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Q_3 :-

$$CaCl_2 + Hg_2(NO_3)_2 \longrightarrow 2HgCl + Ca(NO_3)_2$$

Solid (precipitate)

Q 7:-

T in C° = ? , $V_1 = 197\ L$, $T_1 = 15^\circ$, $P_1 = 760\ mmHg$

$V_2 = 198\ L$, $P_2 = 640\ mmHg$

Solution

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{760\ mmHg \times 197\ L}{15\ C^\circ} = \frac{640\ mmHg \times 198\ L}{T_2}$$

$$\Rightarrow T_2 = 12.7^\circ C$$

Question 6

Not yet answered

Marked out of 2.00

Flag question

How many grams of oxygen, O_2 (Mm=32.0g/mol), are there in a 36.0 L gas cylinder at 20.0°C when the oxygen pressure is 1919 kPa?

Answer:

Question 7

Not yet answered

Marked out of 2.00

Flag question

At what temperature in °C will a fixed amount of gas with a volume of 197 L at 15°C and 760 mmHg occupy a volume of 198 L at a pressure of 649 mm Hg?

Answer:

Question 7

Not yet answered

Marked out of 2.00

Flag question

Predict the precipitate in the following reaction

$(NH_4)_2SO_4 + AgNO_3 \rightarrow$

Answer

Q 6:-

T in $k = 293\ k$

P in atm $= 1919\ kPa \times \frac{9.869 \times 10^{-3}\ atm}{1\ kPa} = 18.94\ atm$

↳ hint :-

$1\ atm = 101.325\ kPa$

$$PV = nRT$$

$$n = \frac{18.94\ atm \times 36.0\ L}{.0821 \frac{atm \cdot L}{K \cdot mol} \times 293\ K} = 28.0\ mol$$

$$m = n \times M_w = 28.0 \times 32.0 = 896\ g$$

Q :- $(NH_4)_2SO_4 + AgNO_3 \rightarrow$

Ag_2SO_4 will precipitate.

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Choose_ will produce a gas when reacted with HCl

Choose_
KOH
AgOH
Hg2Cl2
Zn(OH)2
Ag2SO4
FeS
NaHSO4
Ca(OH)2

imoles of LiI are contained in 258.6 mL of 0.0296 M LiI solution?

Answer: 765

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How many millimoles of LiI are contained in 258.6 mL of 0.0296 M LiI solution?

Answer: 7.65

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According to the following reaction, what volume of 0.244 M KCl solution is required to react exactly with 50.0 mL of 0.210 M Pb(NO3)2 solution?

$$2\,KCl(aq) + Pb(NO3)2(aq) \rightarrow PbCl2(s) + 2\,KNO3(aq)$$

Answer:

At what temperature in K would O_3 (48.00 g/mole) molecules have a root mean square speed (rms) equal to that of O_2 (32.00 g/mole) molecules at 236 K?

Answer: .75

At what temperature **in K** would O_3 (48.00 g/mole) molecules have a root mean square speed (*rms*) equal to that of O_2 (32.00 g/mole) molecules at 296 K?

Answer:

How many **grams** of sodium (23g/mol) are required to produce 20.0 L of hydrogen gas at 0.0 °C and 750 torr?