T18Q4: Level 3 (L.G. 10)

Consider the reaction between 100 mL of 0.41 M iron(II) nitrate with 63 mL of 0.35M potassium phosphate. How many moles of precipitate are formed from this reaction?

A. **0.011**
B. **0.014**
C. **0.022**
D. **0.041**

T17Q6: Level 2 (L.G. 10)

Consider a sealed sample of gas at 33.0°C, 744 mm Hg, and 450 mL. If the pressure is decreased to 725 mm Hg and the temperature is raised to 66.0°C, what is the new volume of the gas?

A. 512 mL
B. 124 mL
C. 417 mL
D. 483 mL

CHANGE in the conditions:
Double State Problem

T14Q5: Level 2 (L.G. 4)

For the reaction $\mathbf{N_2 + 3H_2 \rightarrow 2NH_3}$,
If you react 21 g hydrogen with 56 g nitrogen, what is the maximum number of grams of NH_3 that can be formed?

A. 34 g
B. 68 g
C. 70 g
D. 79 g

7
N
14.01

1
H
1.008

T15Q1: Level 2 (L.G. 1)

How many grams of sodium are in 23 g of sodium sulfate?

8	11	16
O	Na	S
16.00	22.99	32.06

A. 32 g
B. 7.45 g
C. 6.57 g
D. 3.73 g
E. 0.710 g

T13Q7: Level 2 (L.G. 5)

How many fluorine atoms are there in a 38.00 g sample of fluorine gas?

9
F
19.000

A. 2.289×10^{25} atoms
B. 6.023×10^{23} atoms
C. 1.205×10^{24} atoms
D. 2.553×10^{24} atoms

T14Q8: Level 3 (L.G. 8)

Consider the following chemical reaction:

$NaHCO_3(aq) + HCl(aq) \rightarrow H_2CO_3(aq) + NaCl(aq)$

How many grams of hydrogen carbonate are produced if you react 2.8 g of sodium hydrogen carbonate with 3.1 g of hydrochloric acid and the yield is 45%.

A. 5.27 grams
B. 2.37 grams
C. 2.07 grams
D. 0.93 grams

T16Q7: Level 2 (L.G. 12)

Which one of the following molecules is predicted to have the lowest boiling point?

A. H_2S
B. PH_3
C. HCl
D. SiH_4
E. H_2O

T14Q3: Level 2 (L.G. 3)

How many moles of O_2 are required for the complete combustion of 2.2 g of C_3H_8 to form CO_2 and H_2O?

A. **0.050 moles of O_2**
B. **0.15 moles of O_2**
C. **0.25 moles of O_2**
D. **0.50 moles of O_2**

T15Q3: Level 3 (L.G. 4)

Combustion of a 0.9835 g sample of a compound containing only C, H, and O produced 1.900 g of CO_2 and 1.072 g of H_2O. What is the empirical formula of the compound?

A. C_2H_5O
B. $C_2H_5O_2$
C. $C_4H_{10}O_2$
D. $C_4H_{11}O_2$

T13Q3: Level 1 (L.G. 8)

How many moles of water are in 3.6 grams of water?

A. **2.6 x 10^{24} moles**
B. **64.8 moles**
C. **3.6 moles**
D. **0.20 moles**
E. **0.40 moles**

1	8
H	O
1.008	16.00

T16Q5: Level 4 (L.G. 12)

Consider the molecules: H_2O, CO_2, NH_3, CCl_4. The boiling points of these four molecules from lowest boiling point to highest boiling point are -78°C, -34°C, 76°C, 100°C. Place these molecules in order from highest boiling point to lowest boiling point. (**HINT:** Both NH_3 and CO_2 are gases at room temperature.)

A. **H_2O, CCl_4, NH_3, CO_2**

B. **H_2O, NH_3, CCl_4, CO_2**

C. **NH_3, CO_2, CCl_4, H_2O**

D. **H_2O, CCl_4, CO_2, NH_3**

T18Q6: Level 2 (L.G. 8)

What precipitate is most likely formed from a solution containing Ba^{+2}, Na^{+1}, OH^{-1}, and CO_3^{-2}?

A. **$NaOH$**
B. **$BaCO_3$**
C. **Na_2CO_3**
D. **$Ba(OH)_2$**

T17Q8: Level 3 (L.G. 9)

Which of the following samples contains molecules with the greatest average kinetic energy?

A. **1.0 moles of N_2 at 580 K**
B. **1.0 moles of CO at 140 K**
C. **1.0 moles of N_2O at 298 K**
D. **1.0 moles of CO_2 at 440 K**

T17Q10: Level 3 (L.G. 14)

If the temperature of a gas is raised from 100 °C to 200 °C, the average kinetic energy of the gas will ____.

A. **increase by a factor of 2**
B. **increase by a factor of 1.27**
C. **increase by a factor of 100**
D. **decrease by a factor of 2**
E. **decrease by a factor of 100**

T13Q11: Level 2 (L.G. 9)

How many oxygen atoms are found in a 33 g sample of manganese(II) sulfite?

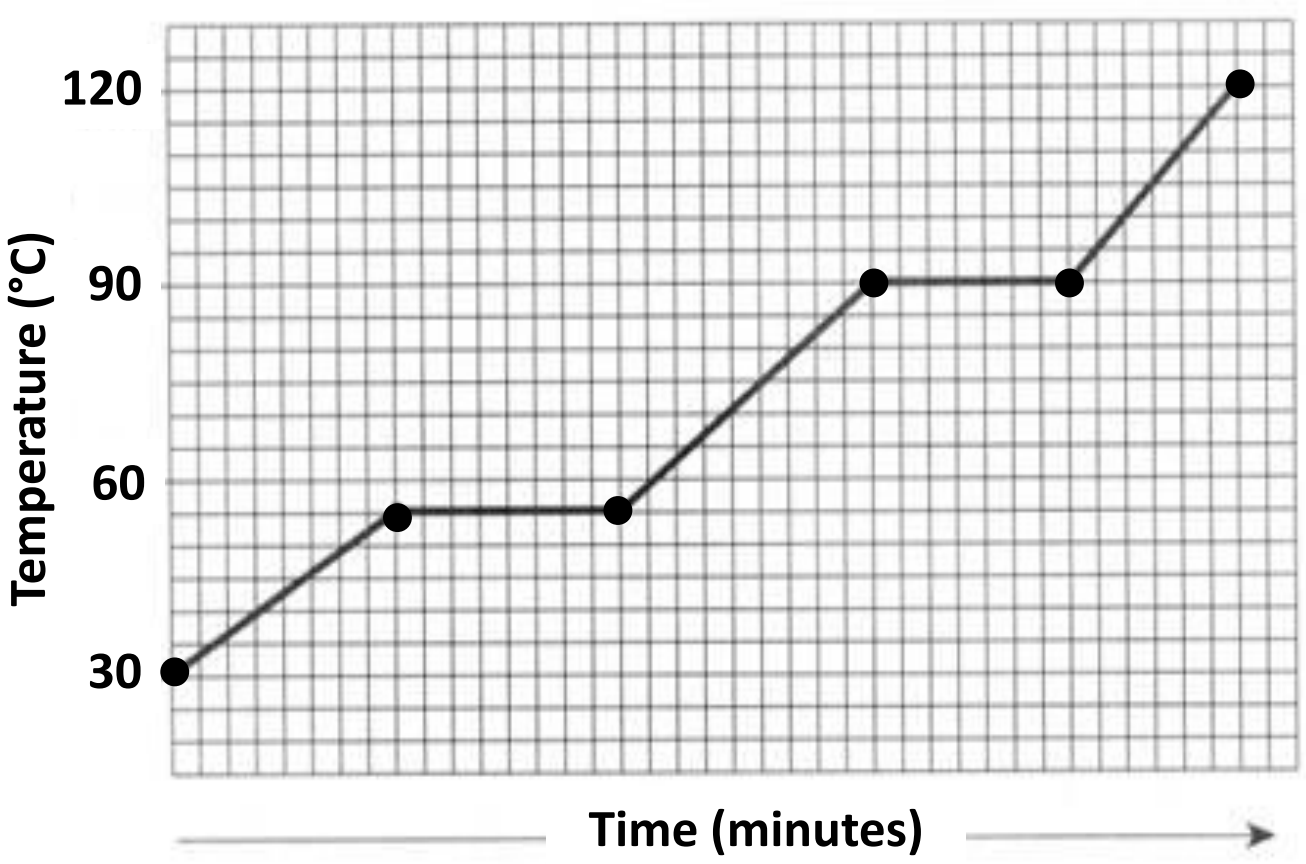
8	16	25
O	S	Mn
16.00	32.07	54.94

A. 1.44 x 10^{23} O atoms
B. 3.94 x 10^{23} O atoms
C. 4.44 x 10^{23} O atoms
D. 7.22 x 10^{23} O atoms

T16Q17: Level 1 (L.G. 3)

Consider the heating curve below for substance X. At 75°C substance X exists as a _____.

A. Solid
B. liquid
C. gas
D. liquid and solid
E. liquid and gas



T15Q6: Level 3 (L.G. 2)

Carnotite ($K_2(UO_2)_2(VO_4)_2$) and is one of 3 common vanadium ores. Vanadium metal can be extracted from this ore as pure vanadium. If you start with 985 g of carnotite, what is the maximum number of grams of V that can be extracted?

A. 59.2 grams
B. 98.5 grams
C. 118 grams
D. 120 grams
E. 130 grams

T13Q9: Level 3 (L.G. 8)

How many moles of ions are there in a sample that is 10 g of magnesium phosphate, $Mg_3(PO_4)_2$?

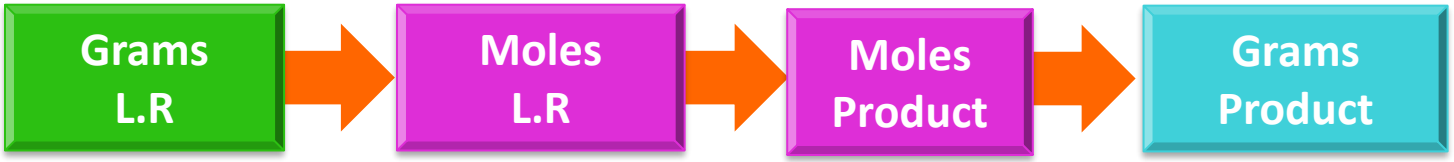
8	12	15
O	Mg	P
16.00	24.31	30.97

A. 5.0 moles
B. 0.49 moles
C. 0.19 moles
D. 0.038 moles

T14Q6: Level 2 (L.G. 4)

Consider the chemical reaction that occurs when iron(III) oxide reacts with carbon to produce iron metal and carbon dioxide: **$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$** If 13.00 g of Fe_2O_3 reacts completely with 4.20 g of C, how much Fe will be formed?

A. 26.08 g
B. 19.54 g
C. 9.05 g
D. 4.52 g
E. 2.26 g



T18Q9: Level 2 (L.G. 9)

Give the **complete ionic equation** for the reaction that occurs when aqueous solutions of lithium sulfide and copper (II) nitrate are mixed:

A. $Li^+(aq) + SO_4^{2-}(aq) + Cu^+(aq) + NO_3^-(aq)$
$\rightarrow CuS(s) + Li^+(aq) + NO_3(aq)$

B. $Li^+(aq) + S^-(aq) + Cu^+(aq) + NO_3^-(aq)$
$\rightarrow CuS(s) + LiNO_3(aq)$

C. $2Li^+(aq) + S^{2-}(aq) + Cu^{2+}(aq) + 2NO_3^-(aq)$
$\rightarrow Cu^{2+}(aq) + S^{2-}(aq) + 2LiNO_3(s)$

D. $2Li^+(aq) + S^{2-}(aq) + Cu^{2+}(aq) + 2NO_3^-(aq)$
$\rightarrow CuS(s) + 2Li^+(aq) + 2NO_3^-(aq)$