T13Q1: Level 1 (L.G. 6)

What is the molar mass of the compound, $Cu_3(PO_4)_2$?

A. 110.5 g/mol
B. 237.6 g/mol
C. 316.6 g/mol
D. 349.6 g/mol
E. 380.6 g/mol

1A												3A	4A	5A	6A	7A	8A
1 H 1.008	2A																2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 23.00	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe

T13Q2: Level 1 (L.G. 6)

The calcium sulfate used in gypsum is a hydrate (meaning that water is absorbed into the sulfate). The formula for gypsum is: $CaSO_4 \bullet 2H_2O$. How much would one mole of gypsum weigh? In other words, what is its molar mass?

A. 172 g
B. 156 g
C. 147 g
D. 141 g
E. 136 g

1A												3A	4A	5A	6A	7A	8A
1 H 1.008	2A																2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 23.00	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe

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

T13Q4: Level 2 (L.G. 8)

How many grams of oxygen are there in 6.2 g of Li_3PO_4?

A. 0.054 grams
B. 0.21 grams
C. 3.43 grams
D. 6.86 grams

3	8	15
Li	O	P
6.94	16.00	30.97

T13Q5: Level 2 (L.G. 9)

How many molecules of water are in 4.1 grams of water?

A. 0.23 molecules
B. 1.4×10^{23} molecules
C. 2.5×10^{24} molecules
D. 4.4×10^{25} molecules

1	8
H	O
1.008	16.00

T13Q6: Level 2 (L.G. 5)

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

9
F
19.000

A. **2.289 x 10^{25} molecules**
B. **6.023 x 10^{23} molecules**
C. **1.205 x 10^{24} molecules**
D. **2.553 x 10^{24} molecules**

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

T13Q8: Level 2 (L.G. 8)

How many moles of sodium atoms are there in 6.3 grams of sodium carbonate?

6	8	11
C	O	Na
12.01	16.00	23.00

A. 0.06 moles
B. 0.12 moles
C. 7.2×10^{22} moles
D. 3.6×10^{22} moles

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

T13Q10: Level 2 (L.G. 9)

How many C atoms are there in a sample of C_3H_8 that contains 6.59×10^{26} H atoms?

1	6
H	C
1.008	12.01

A. 1.98×10^{27} C atoms
B. 2.47×10^{26} C atoms
C. 4.94×10^{26} C atoms
D. 3.17×10^{24} C atoms

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

8 pt challenge

How many moles of sodium atoms are there in 4.4 grams of sodium carbonate?

6	8	11
C	O	Na
12.01	16.00	23.00

A. 2.5 x 10^{22} moles
B. 5.0 x 10^{22} moles
C. 0.04 moles
D. 0.08 moles
E. 0.12 moles

T14Q1: Level 4 (L.G. 8)

An aqueous solution containing 7.60 g of lead(II) nitrate is added to an aqueous solution containing 7.39 g of potassium chloride. If the percent yield is 84.0%, how many grams of excess reagent remain after the reaction is complete?

A. **5.66 g**
B. **4.50 g**
C. **3.33 g**
D. **0.0604 g**

T14Q2: Level 1 (L.G. 2)

Consider the reaction: **$2H_2 + O_2 \rightarrow 2H_2O$**
If 3 moles of H_2 react with 2 moles of O_2, what is the maximum number of moles of H_2O that can be produced?

A. 5 moles
B. 4 moles
C. 3 moles
D. 2 moles

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?

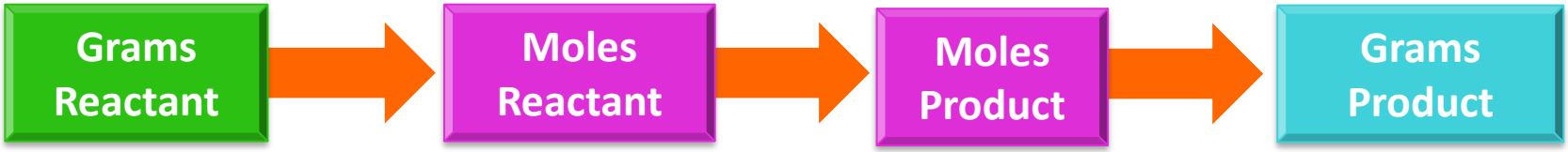
A. **0.050 moles of O_2**
B. **0.15 moles of O_2**
C. **0.25 moles of O_2**
D. **0.50 moles of O_2**

T14Q4: Level 3 (L.G. 4)

Calculate the maximum amount of aluminum oxide (Al_2O_3) that could be produced if 2.5 g of Al react with 2.5 g of oxygen .

A. 4.7 g
B. 5.3 g
C. 7.4 g
D. 9.4 g

Before doing any math:
We need to write a balanced equation for the reaction



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

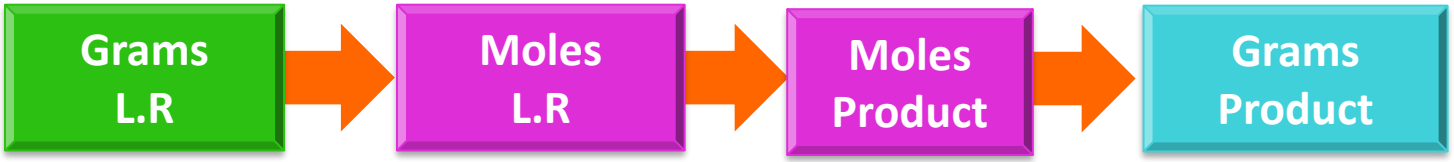
7
N
14.01

1
H
1.008

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



T14Q7: Level 3 (L.G. 8)

Consider the chemical reaction that occurs when sodium metal reacts with oxygen gas: **$4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$**
How many grams of sodium oxide are produced when 5.00 g of sodium and 5.00 g of oxygen react and a 84% yield of sodium oxide is obtained.

A. 5.64 grams
B. 6.73 grams
C. 8.33 grams
D. 9.92 grams

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

T14Q9: Level 3 (L.G. 8)

When 2.5 moles of calcium carbonate is added to 4.8 moles of hydrochloric acid, calcium chloride, carbon dioxide, and water are produced: $\mathbf{CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)}$
Which calculation represents the number of *grams* of calcium chloride that are produced if the reaction proceeds with a 65% yield?

A. **2.5 moles $CaCl_2$ * 110.98 grams/mol * 0.65**
B. **2.4 moles $CaCl_2$ * 110.98 grams/mol * 0.65**
C. **2.5 moles $CaCl_2$ * 110.98 grams/mol / 0.65**
D. **2.4 moles $CaCl_2$ * 110.98 grams/mol / 0.65**

8 pt Challenge: Solution

Once vanadium has been extracted from vanadinite ore it can be used to produce a variety of pure vanadium oxides. One such oxide was found to contain 56.02% vanadium. What is the empirical formula of this oxide?

Species	V	O
%	**56.02 %**	**100 - 56.02 = 43.98%**
Grams	**56.02**	**43.98**
Moles	56.02/(50.94 g/mol) **= 1.09 mol**	43.98/(16 g/mol) **= 2.75 mol**
Mole Ratio	1.09/1.09 **= 1**	2.75/1.09 **= 2.52**) **x 2**

V_2O_5

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

T15Q2: Level 1 (L.G. 1)

The percent water in the hydrate $CuSO_4 \cdot 6H_2O$ is:

A. 40.4%
B. 6.73%
C. 9.60%
D. 57.6%

1	8	16	29
H	O	S	Cu
1.008	16.00	32.06	63.55

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. $C_4H_{11}O_2$

T15Q4: Level 3 (L.G. 4)

An unknown compound has the formula $C_xH_yO_z$. When 0.200 g of the compound is burned in oxygen you isolate 0.293 g of CO_2 and 0.120 g of H_2O. If the experimentally determined molar mass of the compound is 60.07 g/mol, what is its molecular formula?

A. CH_2O
B. $C_2H_4O_2$
C. $C_2H_2O_2$
D. C_2H_2O

T15Q5: Level 3 (L.G. 4)

Prior to their phaseout in the 1980s, chemicals containing lead were commonly added to gasoline as anti-knocking agents. A 8.943 g sample of one such additive containing only lead, carbon and hydrogen was burned in an oxygen rich environment. The products of the combustion were 9.795 g of CO_2 and 5.035 g of H_2O. The *sum* of the subscripts in the empirical formula of the lead additive is:

A. 36
B. 30
C. 29
D. 26

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

T15Q9: Level 4 (L.G. 1)

When an unknown hydrate of Na_2CO_3 is heated until all the water is removed, it looses 54.3% of its mass. What was the formula of the hydrate before it was heated?

A. Na_2CO_3
B. $Na_2CO_3 \cdot 1H_2O$
C. $Na_2CO_3 \cdot 5H_2O$
D. $Na_2CO_3 \cdot 7H_2O$

T15Q12: Level 3 (L.G. 1)

Vanadinite (**$Pb_5(VO_4)_3Cl$**) and is one of the main industrial ores that are used for the extraction of elemental vanadium.
If you start with 1.21 kg of $Pb_5(VO_4)_3Cl$, what is the maximum number of grams of V that can be extracted from this ore.

A. 43.2 grams
B. 130 grams
C. 155 grams
D. 173 grams

T16Q1: Level 3 (L.G. 12)

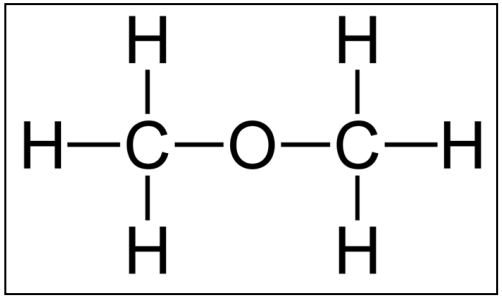
How many of the following molecules exhibit H-bonds, how many exhibit dipole-dipole interactions and how many exhibit London Dispersion forces respectively?

CH_4 CH_3OH H_2S NH_3

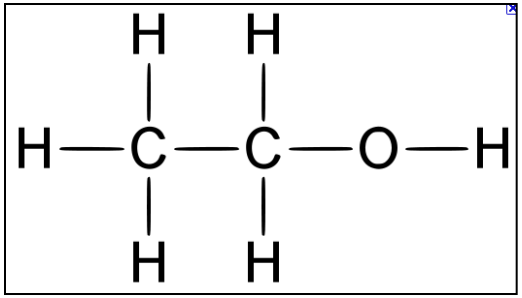
A. 1, 2 and 4
B. 2, 2 and 4
C. 2, 3 and 4
D. 2, 0 and 2
E. 1, 2 and 1

T16Q2: Level 2 (L.G. 12)

Which of the following has a higher boiling point and why?



Dimethyl ether (CH_3OCH_3)



Ethanol (CH_3CH_2OH)

A. Dimethyl ether because it has LDF, dipole-dipole interactions and hydrogen bonds

B. Dimethyl ether because it has only LDF and dipole-dipole interactions

C. Ethanol because it has LDF, dipole-dipole interactions and hydrogen bonds

D. Ethanol because it has only LDF and dipole-dipole interactions

T16Q3: Level 2 (L.G. 12)

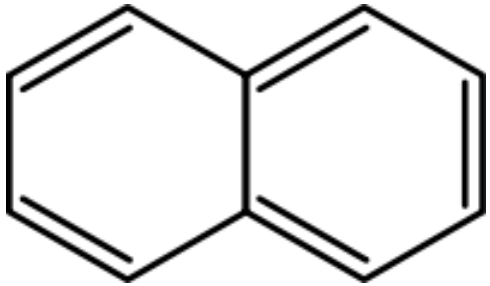
Based on the $\Delta H_{vaporization}$ values shown in the table below, which of the following compounds has the strongest intermolecular forces (IMF's)?

A. Argon
B. Benzene
C. Ethanol
D. Water
E. Methane

Substance	ΔH_{vap}
Argon (Ar)	6.3 kJ/mol
Benzene (C_6H_6)	31 kJ/mol
Ethanol (C_2H_5OH	39.3 kJ/mol
Methane (CH_4)	9.2 kJ/mol
Water (H_2O)	40.8 kJ/mol

T16Q4: Level 3 (L.G. 12)

Napthalene ($C_{10}H_8$) is an organic molecule that has only LDF. How is it possible then that napthalene is a solid at room temperature, but water is a liquid?



A. **Molecules with stronger IMF always have have higher boiling points.**

B. **Water molecules can form H-bonds so water must have stronger IMF than those of napthalene.**

C. **Napthalene is a large planar molecule and so its LDF's are stronger than the H-bond in water.**

D. **Molecules with stronger IMF are more likely to be solids at room temperature.**

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**

T16Q6: Level 3 (L.G. 12)

Pure samples of which of the following compounds will exhibit hydrogen bonding?

I. CH_3OH II. CH_3NO_3 III. CH_3CN

A. I only
B. I and II only
C. II and III only
D. I, II and III

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

T16Q13: Level 2 (L.G. 11)

Which of the following statements is **not** characteristic of a hydrogen bond?

A. **The other atom involved in the hydrogen bond (not the hydrogen atom) must be a very electronegative atom that is attached to another hydrogen atom.**

B. **The other atom involved in the hydrogen bond (not the hydrogen atom) always possesses at least one lone pair of electrons.**

C. **The hydrogen atom involved must be covalently bonded to a very electronegative atom.**

D. **Hydrogen bonds are typically weaker than ionic or covalent bonds.**

T16Q14: Level 2 (L.G. 12)

The boiling point of water is about 200°C higher than one would predict from the boiling points of hydrogen sulfide and hydrogen selenide. One may explain this apparent anomaly by which of the following?

A. **The H-O covalent bond is much stronger than the H-S and H-Se bonds**

B. **Water has the lowest molecular weight**

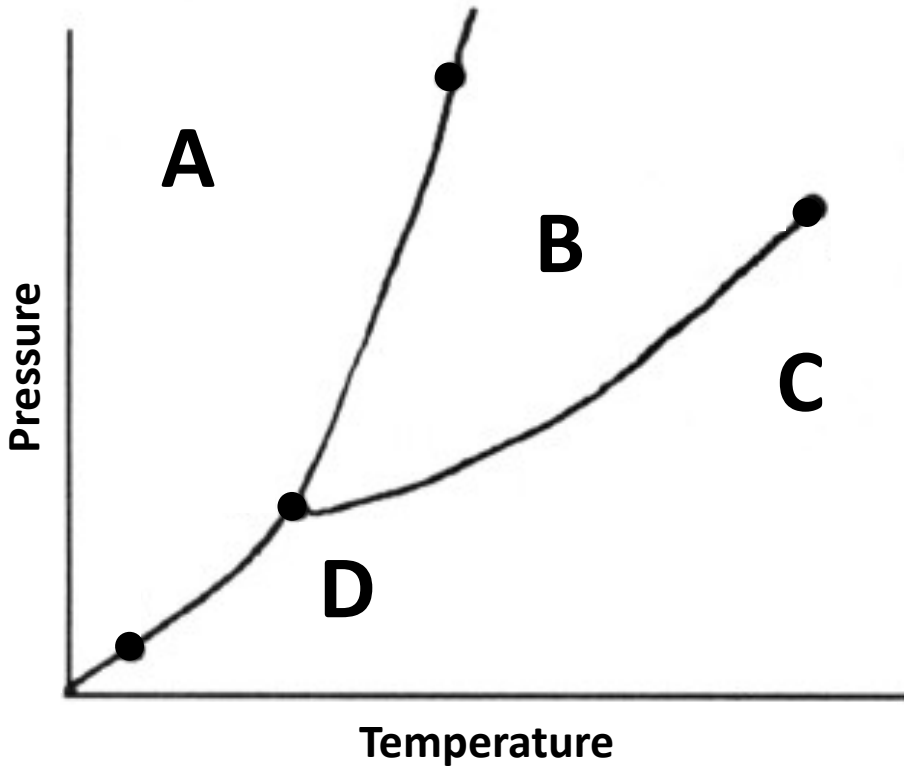
C. **The intermolecular attractive forces are much greater in water than in hydrogen sulfide and hydrogen selenide.**

D. **Water is less polar than hydrogen sulfide and hydrogen selenide.**

T16Q16: Level 1 (L.G. 3)

Which region on the phase diagram below corresponds to the solid phase?

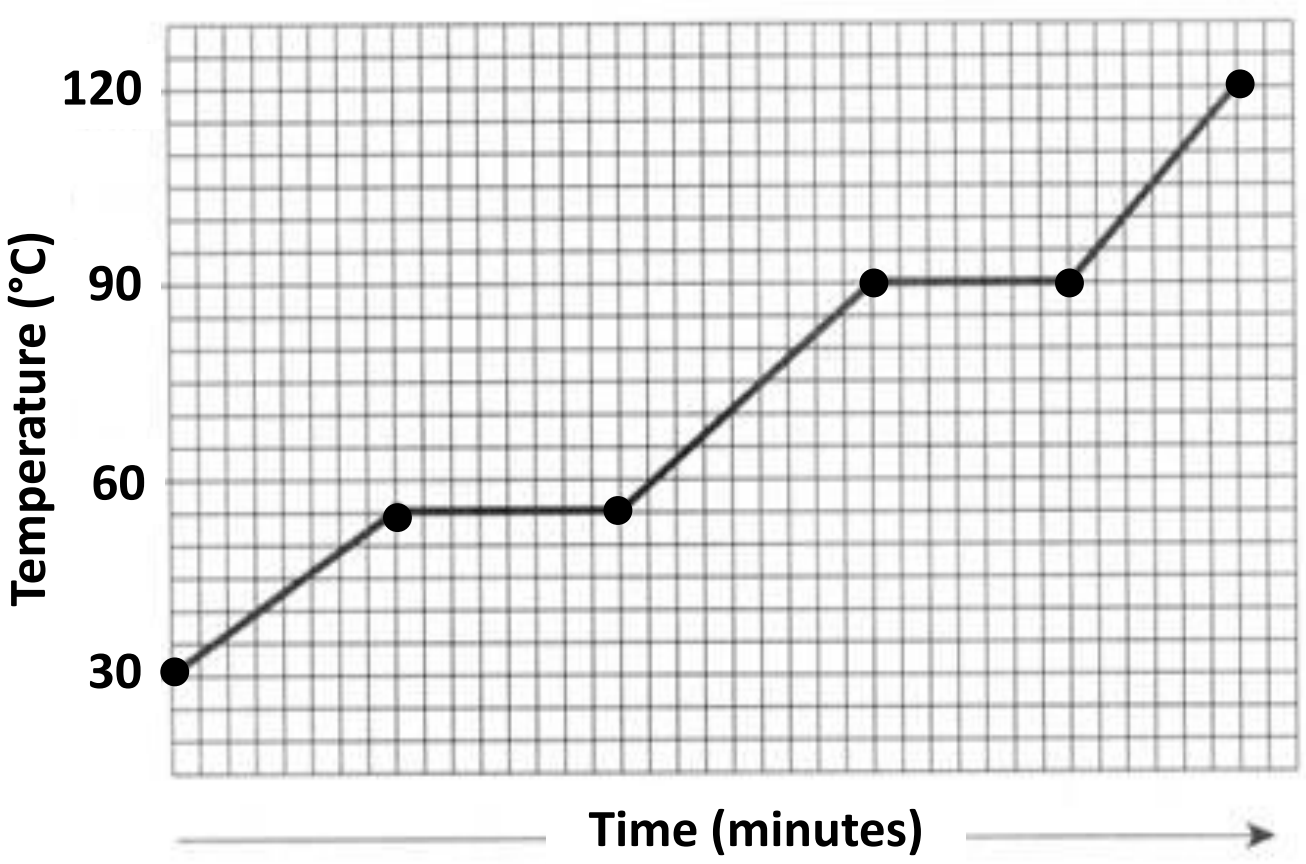
A. A
B. B
C. C
D. D



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



8 pt Challenge

Octane (C_8H_{18}) is a straight chain of carbon atoms with no dipole moment and a boiling point of 125°C. Water has a dipole moment, can hydrogen bond and has a boiling point of 100°C. The difference between these two boiling points can best be rationalized by:

A. **Intermolecular forces between molecules with dipole moments are greater than between molecules with no dipole moment**

B. **Hydrogen bonding is a strong intermolecular force**

C. **London dispersion forces are weak but there are many LDFs in octane so the net IMF in C_8H_{18} is greater than the net IMF in H_2O**

D. **London dispersion forces are strong and so the boiling point of octane is greater than the boiling point of water**

E. **There is no trend, this is a magical mystery of science**

T17Q1: Level 2 (L.G. 9)

Calculate the volume of helium in a 2-mole helium balloon that floats up into the atmosphere and is left inflated to a total pressure of 1.5 atm at a temperature of -73 deg C.

A. **37.9 L**
B. **22.1 L**
C. **7.98 L**
D. **0.045 L**

T17Q2: Level 2 (L.G. 1)

At what values of temperature and pressure would real gases behave more like ideal gases?

A. **Low pressure and low temperature**
B. **High pressure and high temperature**
C. **Low pressure and high temperature**
D. **High pressure and low temperature**

T17Q3: Level 3 (L.G. 9)

What volume of O_2 is needed to completely react with 28.0 g NH_3 at 24°C and 0.950 atm to form NO and water?

A. 4.26 L

B. 42.3 L

C. 46.1 L

D. 52.8 L

T17Q4: Level 3 (L.G. 11)

Determine the molecular weight of a gas that has a density of 5.75 g/L at STP.

A. **3.90 g/mol**
B. **129 g/mol**
C. **141 g/mol**
D. **578 g/mol**

T17Q5: Level 3 (L.G. 11)

Determine the density of a sample of unknown gas with a molar mass of 129 g/mol at STP.

A. **0.174 g/L**
B. **5.76 g/L**
C. **8.64 g/L**
D. **576 g/L**

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

T17Q7: Level 3 (L.G. 10)

A 1.9 mol sample of gas in a rigid flask at 21°C and 697 mm Hg is opened to the atmosphere and more gas is added to the flask. The pressure after the addition of gas is 795 mm Hg and the temperature is 26°C. How many moles of gas have been added to the container?

A. 0.23
B. 1.63
C. 1.75
D. 2.13
E. 2.9

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**

T17Q9: Level 1 (L.G. 15)

Consider 1L gaseous samples of He (4amu), Ne (20amu), and Ar (40amu). If each sample is at STP (273K, 1 atm). Which gas will have the highest molar kinetic energy?

A. **He**
B. **Ne**
C. **Ar**
D. **They all have the same energy**

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**

8 pt Challenge again

Consider a rigid tank containing both HF and HBr gases. If this tank develops a leak, what is the ratio of the rate of effusion of HF to the rate of effusion of HBr at constant T?

A. **4.04**
B. **0.247**
C. **2.01**
D. **0.497**

T18Q1: 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. $2Li^+(aq) + S^{2-}(aq) + Cu^{2+}(aq) + 2NO_3^-(aq)$
$\rightarrow CuS(s) + 2Li^+(aq) + 2NO_3^-(aq)$

T18Q2: Level 2 (L.G. 9)

Give the **net ionic equation** for the reaction that occurs when aqueous solutions of barium nitrate and ammonium phosphate are mixed:

A. $3Ba(NO_3)_2(aq) + 2(NH_4)_3PO_4(aq) \rightarrow Ba_3(PO_4)_2(s) + 6NH_4NO_3(aq)$

B. $3Ba(NO_3)_2(aq) + 2(NH_4)_3PO_4(aq) \rightarrow Ba_3(PO_4)_2(aq) + 6NH_4NO_3(s)$

C. $2NO_3^-(aq) + 6NH_4^+(aq) \rightarrow 6NH_4NO_3(s)$

D. $3Ba^{2+}(aq) + 2PO_4^-(aq) \rightarrow Ba_3(PO_4)_2(s)$

E. $2NO_3^-(aq) + 6NH_4^+(aq) + 2PO_4^-(aq) \rightarrow Ba_3(PO_4)_2(s) + 6NH_4^+(aq) + NO_3^-(aq)$

T18Q3: Level 3 (L.G. 10)

Consider the decomposition of calcium carbonate to form calcium oxide and carbon dioxide. If the reaction produced 732 mL of CO_2 at 21°C and 77.1 cm Hg, how many grams of CaO are produced?

A. **0.21 g**
B. **1.73 g**
C. **1.86 g**
D. **3.10 g**
E. **17.2 g**

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**

T18Q5: Level 3 (L.G. 10)

What mass, in g, of AgCl is formed from the reaction of 75.0 mL of a 0.078 M $AgC_2H_3O_2$ solution with 55.0 mL of 0.109 M $MgCl_2$ solution?

A. **0.860 g**
B. **1.72 g**
C. **2.56 g**
D. **3.20 g**

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. **$Ba(OH)_2$**

T18Q7: Level 3 (L.G. 8)

How many of the following compounds are **soluble** in water?

$Cu(OH)_2$ $LiNO_3$ NH_4Br K_2SO_4 $PbCl_2$ $BaSO_4$

A. 0
B. 1
C. 2
D. 3
E. 4

T18Q8: Level 1 (L.G. 6)

Choose the reaction that represents a combustion reaction:

A. $C_6H_{12}O_2(l) + 8O_2(g) \rightarrow 6CO_2(g) + 6H_2O(g)$
B. $Mg(s) + Cl_2(l) \rightarrow MgCl_2(aq)$
C. $C_6H_{12}O_2(l) \rightarrow 6C(s) + 6H_2(g) + O_2(g)$
D. $NaOH(aq) + CuCl_2(aq) \rightarrow NaCl_2(aq) + Cu(OH)_2(s)$
E. None of the above are combustion

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