

Chem 8 10-30-18 #3

1) Calc Mm

HNO_3

KMnO_4

$\text{Co}_3(\text{PO}_4)_2$

SiO_2

Co_2S_3

2) Calc % mass in each compound:

$\text{C}_{17}\text{H}_{19}\text{NO}_3$

$\text{C}_{19}\text{H}_{21}\text{NO}_3$

$\text{C}_{22}\text{H}_{24}\text{N}_2\text{O}_8$

3) Calc moles of 143.5g $\text{Zn}(\text{NO}_3)_2$

4) Calc total atoms in 0.410 mole NH_3

5) Calc moles Cl in 0.255g AlCl_3

6) Calc mass 2.08×10^{20} particles $\text{C}_6\text{H}_{12}\text{O}_6$

7) Determine shape and **shape**

NH_3 CH_2O SO_3^{2-}

POCl_3 BeI_2 PO_3^{3-}

BH_3 SeBr_2 XeO_4

8) Identify the most polar bond:

N-I , N-Br , N-Cl , N-F

9) How many atoms of H are in 10 molecules $\text{C}_6\text{H}_{12}\text{O}_6$?

10) How many moles of Cr in 2 moles of $\text{Na}_2\text{Cr}_2\text{O}_7$?

11) Calc moles in 20g S_8F_2

12) Calc mass of 6.3×10^{21} units of MgBr_2

13) Find the EF:

0.1929g C

0.01679g H

0.09566g O

0.1898g Cl

14) Find EF:

2.514g Ca

1.004g O

15) Find EF:

58.84% Ba

13.74% S

27.43% O

16) A compound has an EF of CH_2 and the Mm of the compound is 84. Find MF.

17) Select the atom from which it is easiest to remove e:

F, O, B, C, N

18) Which pair of atoms has the largest difference in size?

Ca, Sr, Ti, Ge, Al

19) Choose the pair of atoms that has the least difference in size?

Nb, Ru, Ag, Sb, Zr

20) Choose the formula that is 30.45% N

N_2O , NO , N_2O_5 , NO_2 , N_2O_3

21) A student is given 26.98g Al and 24.31g Mg, which mass contains more atoms?

22) Calculate the atoms in 0.5g Ca

23) Calc the Mm of magnesium sulfate heptahydrate

24) The molecule with two double bonds is

CO , H_2O , C_2H_4 , C_4H_6

25) Select the planar molecule:

BF_3 , H_2CO , PCl_3 , NI_3

26) Determine Z_{eff} for Fe $3d^5$

27) Select molecule with only one unshared e-pair:

I_2 , N_2 , PH_3 , CBr_4 , Cl_2O

28) Identify the atom in this list

Na, Mg, Al, Si, P

that correlates with the following ionization energies

1st 2nd 3rd 4th 5th

1060 1890 2965 4960 6270

6th 21200

29) Identify the atom with the highest ionization energy

30) Which molecule has the most polar bond?

N_2 , CO_2 , CH_3I , H_2O

7 Shape and polarity

NH_3  Pyr, polar

POCl_3 tet, polar

BH_3 T. planar nonpolar

CH_2O T. planar polar

BeI_2 linear nonpolar

SeBr_2 bent polar

SO_3^{2-} pyr polar

PO_3^{-3} pyr polar

XeO_4 tet nonpolar

8 Identify the most polar bond:

N-I

N-Br

N-Cl

N-F

1. ~~Calculate mass of~~
~~Na₂CO₃~~

~~114~~
How many atoms of H in 10 molecules
of $C_6H_{12}O_6$? ~~9~~

120 atoms

How many moles Cr in 2 moles
of $Na_2Cr_2O_7$? ~~10~~

4

How many molecules in 20g SO_2 ? ~~15~~

3.7×10^{22}

5. How much mass in 6.3×10^{21} fu

$MgBr_2$

1.92 g

13

$$\begin{aligned}
 0.1929 \text{ g C} &\times \frac{1 \text{ mole}}{12.01} = \frac{0.016061615 \text{ mole C}}{0.00535 \dots} = 2.999 = \underline{3} \\
 0.01079 \text{ g H} &\times \frac{1 \text{ mole}}{1.008} = \frac{0.01070436 \text{ mole H}}{0.00535 \dots} = \underline{2} \\
 0.08566 \text{ g O} &\times \frac{1 \text{ mole}}{16.00} = \frac{0.00535375 \text{ mole O}}{0.00535 \dots} = \underline{1} \\
 0.1898 \text{ g Cl} &\times \frac{1 \text{ mole}}{35.45} = \frac{0.005354019 \text{ mole Cl}}{0.00535 \dots} = \underline{1}
 \end{aligned}$$



14

$$\begin{aligned}
 2.514 \text{ g Ca} &\times \frac{1 \text{ mole}}{40.08} = \frac{0.0627245509 \text{ mole Ca}}{0.0627 \dots} = \underline{1} \\
 1.004 \text{ g O} &\times \frac{1 \text{ mole}}{16.00} = \frac{0.06275}{0.0627 \dots} = \underline{1}
 \end{aligned}$$



15

$$\begin{aligned}
 58.84 \text{ g Ba} &\times \frac{1 \text{ mole}}{137.3} = \frac{0.4285506 \text{ mole Ba}}{0.428 \dots} = \underline{1} \\
 13.74 \text{ g S} &\times \frac{1 \text{ mole}}{32.07} = \frac{0.42843779 \text{ mole S}}{0.428 \dots} = \underline{1} \\
 27.43 \text{ g O} &\times \frac{1 \text{ mole}}{16.00} = \frac{1.714375 \text{ mole O}}{0.428 \dots} = \underline{4}
 \end{aligned}$$



$$6.280 \text{ g AlCl}_3 - 1.271 \text{ g Al} = 5.009 \text{ g Cl}$$

$$\begin{aligned}
 1.271 \text{ g Al} &\times \frac{1 \text{ mole}}{26.98} = \frac{0.0471089 \text{ mole Al}}{0.047 \dots} = \underline{1} \\
 5.009 \text{ g Cl} &\times \frac{1 \text{ mole}}{35.45} = \frac{0.1412976 \text{ mole Cl}}{0.047 \dots} = \underline{3}
 \end{aligned}$$



~~37~~ ~~218~~ ~~214~~ ~~116~~ ~~6~~
 A compound has an EF of CH_2O . The actual compound has a Mm of 90. Calc the molecular formula.

$$\frac{90}{30} = 3 \quad 3(\text{CH}_2\text{O}) = \boxed{\text{C}_3\text{H}_6\text{O}_3}$$

~~37~~ ~~218~~ ~~116~~
 A compound with EF = CH_2 has a MF Mm of ~~78~~. Determine MF.

$$\frac{\cancel{78} 84}{\cancel{13.018} 14.018} = 6 \quad 6(\text{CH}_2) = \boxed{\text{C}_6\text{H}_{12}}$$

~~40~~ ~~218~~ ~~214~~
 A compound has an EF of CH_4O . The Mm is 192. Calc MF

$$\frac{192}{32} = 6 \quad 6(\text{CH}_4\text{O}) = \text{C}_6\text{H}_{24}\text{O}_6$$

~~17~~ ~~18~~ ~~19~~ ~~20~~ ~~21~~ 17

① which is it easiest to remove an e^-

~~18~~ ~~19~~

F, O, B, C, N

}

② ~~18~~ ~~19~~

18

which pair of atoms is got the largest difference in size

~~19~~ ~~20~~

Ca, Sc, Ti, Ge, As

(Ca, As)

③ ~~19~~ ~~20~~

19

which pair is likely to

~~20~~

have the least difference in size? ~~20~~

~~20~~

Nb, Ru, Ag, Sb, Zr

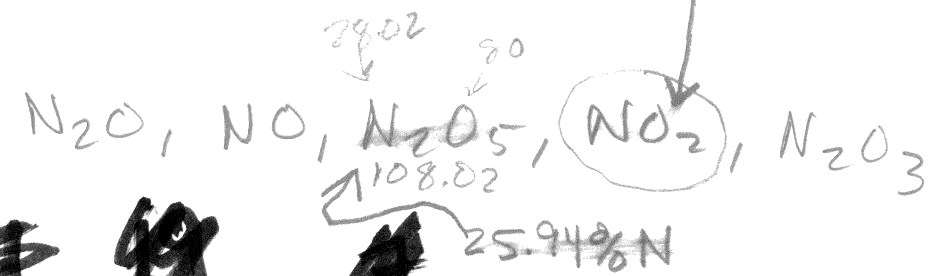
~~21~~

(Nb, Zr)

~~3~~ ~~21~~ ~~20~~ ~~18~~ ~~14~~ ~~22~~

Determine which formula for an oxide of N is 30.45% N. **20**

~~20~~



~~3~~ ~~18~~ ~~22~~

A student is given 26.98g Al and 24.31g of Mg. Select the answer:

~~21~~

- more Mg atoms than Al atoms
- more Al than Mg **21**
- equal Al and Mg

~~5~~ ~~4~~ ~~15~~

~~2~~

~~22~~

22

Calculate atoms in 0.5g Ca

~~10~~ ~~14~~

7.51×10^{21} atoms Ca

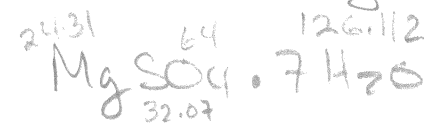
$0.5 \times \frac{1}{40.08} = 0.01247 \text{ mole Ca} \times N_A$

~~4~~ ~~5~~ ~~20~~ ~~18~~

23

Calculate the molar mass of magnesium sulfate hepta hydrate.

~~16~~



~~22~~ ~~13~~

246.492

246.492

~~13~~ ¹⁵ **24** $\text{H}_2\text{C}=\underset{\text{H}}{\text{C}}-\underset{\text{H}}{\text{C}}=\text{CH}_2$ C_4H_6
 The molecule with only two

double bonds:

a) CO b) H_2O c) C_2H_4 d) C_4H_6

e) C_6H_6

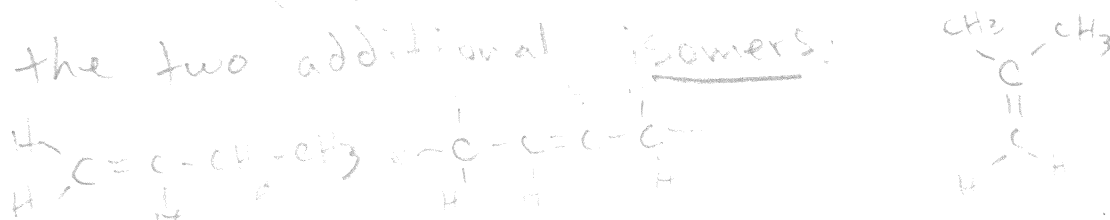
~~16~~ ~~14~~ **25**
 Select the planar molecule

a) H_2CO b) BF_4^- c) PCl_3 d) CHBr_3

e) NI_3

~~17~~ **26**
 Determine effective nuclear charge for Fe 3d electrons. ($Z = +6$)

~~18~~ Given $(\text{CH}_2=\text{CHCH}_2\text{CH}_3)$, Draw its L.S., then the two additional isomers:



(4)

$$\text{CH}_3\text{COOH}$$
$$\text{CH}_3\text{CH}_2\text{COOH}$$

flerre

8 Which of the following has only one unshared pair of e^- ?

A hand-drawn diagram of a person with an arrow pointing to the head. The person is represented by a circle with a vertical line for the body and four short lines for limbs. The number '06' is written above the head. An arrow points from the left towards the head.

28

2nd
1890

3rd
~~2nd~~
2905

14th
1945

6270

64
21,200

a) Na

b) M_{eff}

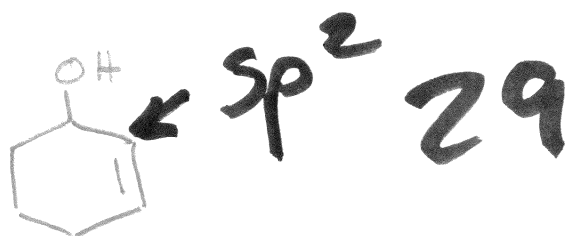
c) A1

d) S:

e) P

12 Identify all the hyb in:

~~28~~



~~24~~

Which molecule has the largest dipole moment? 30

- a) N_2 b) CO_2 c) CH_3I d) Br_2 e) H_2O

~~25~~

Given H_2O , NCl_3 , SCl_6 , PBr_5 :

Which of the following does not describe any of the above molecules?

- a) bent b) pyramidal c) octahedral
d) T-shaped e) T-shaped