Chem 8 ID- 29-1B #2

(31) Formula
copper (I) oxide
potassium peroxide
aluminum hydroxide
zinc nitrate
iron (II) carbonate

(32) A compound contains 0.0130 mol C, 0.0390 mol H, 0.0065 mol O. The Mm is 92. Calc EF and MF.

(33) A compound is 11.66 g Fe and 5.01 g O. Calc EF.

(34) A compound is 40% C, 6.7% H, 53.3% O. The Mm is 180. Find EF and MF.

(35) 1 g lead (II) nitrate is combined with KI.
a) write balanced ppt rxn.
b) calc mass ppt formed.
[redacted]

(37) Identify the most polar bond:
C-F, C-O, C-N, C-B

(38) Select molecule with covalent and ionic bonds:
NaCl, $Na_2C_2O_4$, $MgCl_2$
NBr_3, $POCl_3$

(39) Balance:
$Ca(OH)_2 + HCl \rightarrow H_2O + CaCl_2$

(40) Which element has a valence of $3e^-$?
S, Ca, Ga, Sb, Br

(41) Why is N^{-3} larger than N?

(42) Why is the ionization of Mg^{+2} higher than Mg?

(43) 0.2 mole Br^- is combined with 0.1 mole S^{-2}. Calc moles $Pb(NO_3)_2$ needed to ppt all the anions.

(44) Calc mass carbon in 7 g $HC_2H_3O_2$.

(45) Calc mass of $(NH_4)_2SO_4$ made from 16 g H.

Must Draw LF

(46) Give shape and polarity:
NH_3, PF_3, CBr_4, SO_3^{-2}, NO_2^-, HCN

(47) Find EF for:
68.8% C, 4.95% H, 26.2% O.
[redacted]

(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 26.98 g Al and 24.31 g Mg. Which mass contains more atoms?

(22) Calculate the atoms in 0.5 g Ca.

(23) Calc the Mm of magnesium sulfate hepta hydrate. $MgSO_4 \cdot 7H_2O$
[redacted]

(25) Select the planar molecule:
BF_4^-, H_2CO, PCl_3, NI_3

(26) Determine Z_{eff} for Fe 3d e^-.

(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, ? that correlates with the following ionization energies

1st	2nd	3rd	4th	5th	6th
1060	1890	2905	4950	6270	21,700

[redacted]

Chem 8 10L 29-1B #2

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(35) 1 g lead (II) nitrate is combined with KI.
a) write balanced ppt rxn.
b) Calc mass ppt formed.
c) write net ionic ppt equation.
d) Identify spectator ions.

(36) write the ionization equation for Na_3PO_4.

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(47) Find EF for:
68.8% C, 4.95% H, 26.2% O.

(48) Find formula of a hydrate that contains 0.737 g $MgSO_3$ and 0.763 g H_2O.

(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 26.98 g Al and 24.31 g Mg. which mass contains more atoms?

(22) Calculate the atoms in 0.5 g Ca.

(23) Calc the Mm of magnesium sulfate hepta hydrate.

(24) The molecule with two double bonds is _____.
CO, H_2O, C_2H_4, C_4H_6

(25) Select the planar molecule:
BF_4^-, H_2CO, PCl_3, NI_3

(26) Determine Z_{eff} for Fe 3d e⁻.

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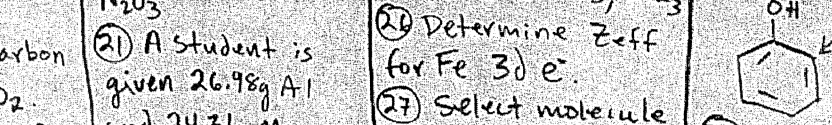
(29) Identify hybridization at the atom noted by arrow:



(30) which molecule has largest dipole moment?
N_2, CO_2, CH_3I, H_2O

(4) formula

copper (I) oxide Cu_2O

potassium peroxide K_2O_2

aluminum hydroxide $Al(OH)_3$

zinc nitrate $Zn(NO_3)_2$

iron (II) carbonate $FeCO_3$

ammonia NH_3

ammonium NH_4^+

iron (III) $Fe_2(CO_3)_3$

(5) find EF

a) 0.0130 mol C, 0.0390 mol H, 0.0065 mol O

2 | 6 | 1

C_2H_6O 46.068 $C_4H_{12}O_2$ 92.13

11.66 g iron, 5.01 g O

$11.66\,g\,Fe \times \frac{}{55.85} = \frac{0.2087735\,mole\,Fe}{0.208\ldots} = 1\ (2)$

$5.01\,g\,O \times \frac{}{16.00} = \frac{0.31312\,5\,mole\,O}{0.208\ldots} = 1.499831157\ (2)$

$= 3$

Fe_2O_3

40% C, 6.7% H, 53.3% O

CH_2O $M_m = 180$

$C_6H_{12}O_6$

$Pb(NO_3)_2$ + 2KI → $PbI_{2(s)}$ + 2KNO$_3$

35 1g $Pb(NO_3)_2$ is combined with an excess of potassium iodide solution. Calc mass of solid. **1.4g** K^+, NO_3^-

$Pb^+ + 2I^- \rightarrow PbI_2$

2. write net ionic equation for the form. of solid.

$Pb^{+2} + 2KI \rightarrow PbI_{2(s)}$

3. What are the spectator ions in #1

K, NO_3^-

4. 25mL of an $HClO_4$ soln is titrated to the equiv. point with 22.62mL of 0.2M NaOH. Calc conc of $HClO_4$ soln

$$0.02262\,L \times \frac{0.2\,mole}{L} = 0.004524\,mole$$

$$\frac{0.004524\,mole}{0.025\,L} = 0.18096\,M\ HClO_4$$

$H_3PO_4 + 3NaOH \rightarrow 3H_2O + Na_3PO_4$

5. 26.38mL of a 0.1M NaOH soln was used to titrate 30mL of a soln containg H_3PO_4 to its equiv. point. Calc M H_3PO_4 => 0.02931M

A strip of Mg is placed in HCl. A violent rxn occurs. Zn powder is placed in HCl. No rxn. The mixture is heated. a violent rxn occurs. complete the sentence:

Mg metal is more reactive than Zn metal

Na metal is placed in a test tube. H_2O is added and bubbles form. A flaming splint is inserted into the gas and a "ploop" is heard. The gas is hydrogen

Ionize the compounds - split into ions:

$Fe_2O_3 \rightarrow 2Fe^{+3} + 3O^{-2}$

$MnCl_3 \rightarrow Mn^{+3} + 3Cl^-$

$ZnO \rightarrow Zn^{+2} + O^{-2}$

$AlN \rightarrow Al^{+3} + N^{-3}$

$Na_3PO_4 \rightarrow 3Na^+ + PO_4^{-3}$

$Ba(HCO_3)_2 \rightarrow Ba^{+2} + 2HCO_3^-$

$Na_3N \rightarrow 3Na^+ + N^{-3}$

Rank polar bonds from high to Low

37

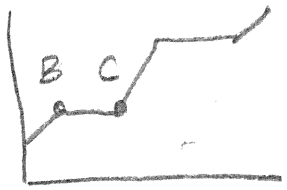
C-B C-O C-N C-F

C-F > C-O > C-N > C-B

Identify the solid, $KMnO_4$

atomic solid, metallic solid, molecular, ionic

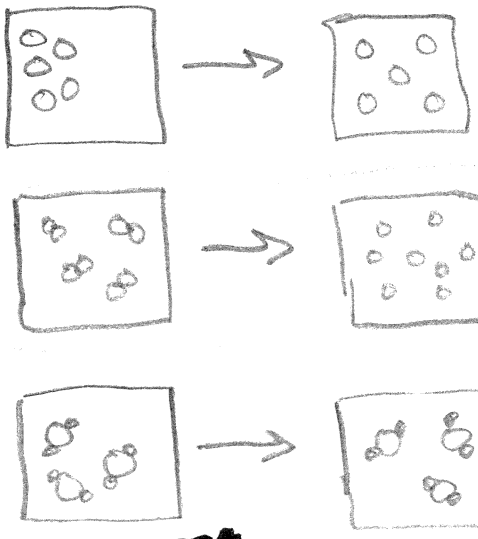
Solid Ar is heated over a long time period. The bonds broken in B-C are ——.



Rank the following molecules in increasing IMF Strength.

CH_3CH_3 $CH_3CH_2CH_2CH_3$ $CH_3CH_2CH_2CH_2CH_2CH_3$

Identify the chemical change:



which compound has ionic and covalent bonds:

$NaCl$ $Na_2C_2O_4$ $MgCl_2$ Li_3N

Balance: $Ca(OH)_2 + 2HCl \rightarrow 2H_2O + CaCl_2$

In (18) Identify the type of rxn:

neutralization

$KOH + HNO_3 \rightarrow H_2O + KNO_3$

$Mg + FeCl_2 \rightarrow Fe + MgCl_2$

Redox

39 Which element has a valence of $3e^-$?

40 S, Ca, Ga, Sb, Br

41 Why is N^{-3} larger than N?

e^- repulsion

42 Why is the ionization of Mg^{+2} greater than Mg?

Mg^{+2} has higher ~~Zeff~~

43

(11) 0.2 mole Br^- is combined with 0.1 mole S^{-2}. Calc mole Pb^{+2} needed to react with <u>all</u> $Br^- + S^{-2}$?

$$0.2 \text{ mole } Br^- \times \frac{1\ PbBr_2}{2\ Br^-} = \underline{0.1 \text{ mole } Pb^{+2}}$$

$$0.1 \text{ mole } S^{-2} \times \frac{1\ PbS}{1\ S^{-2}} = \underline{0.1 \text{ mole } Pb^{+2}}$$

0.2 mole Pb^{+2}

3 M $Pb(NO_3)_2$

$$\frac{0.2 \text{ mole Pb}}{3\ M} = 0.066\ L$$

66 mL $Pb(NO_3)_2$

Molar Mass

$HC_7H_5O_2$ (122)

$Mg(OH)_2$ (58.3)

$(NH_2)_2CO$ (60)

$CH_3CO_2C_5H_{11}$ (130)

C_2H_2 (26)

$(NH_4)_2SO_4$ (132.1)

44

Calc mass of carbon in 7g $HC_2H_3O_2$.

60.052

$2(12.01) = 24.02$

$\frac{24.02}{60.052} = 0.39998$

$(0.39998)(7g) =$ 2.7999g C

45

Calc mass of $(NH_4)_2SO_4$ produced when 16g H is used.

%H = 0.061

mass comp = $\frac{16g\ H}{0.061}$

= 262.295g comp.

Calc % mass indicated element:

C_2H_2 (26) (92.3%)

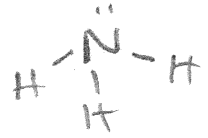
$(NH_4)_2SO_4$ (132) (%H = 6.1)

$HC_6H_7O_6$ (176) %O = 54.5%

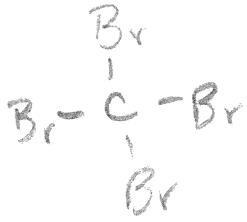
$PtCl_2(NH_3)_2$ (300) %Pt = 65.01

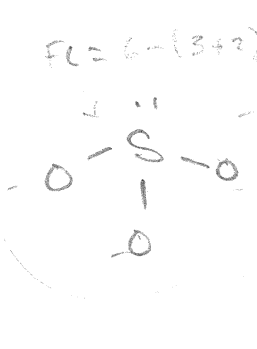
$1s^2 2s^2 2p^6$

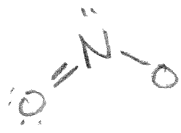
Draw NH_3. Shape? Polarity? 46

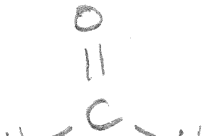

Polar pyramidal


PF_3 pyramidal, polar


CBr_4 Tet, nonpolar


CO_3^{-2} pyramidal, Polar


NO_2^- bent, polar


T. planar polar

HCN H-C≡N: linear polar

3. continued - % composition

Calculate % composition all elements in $Cu(IO_4)_2$ 24.1, 27, 48

Calculate % composition all elements in $(NH_4)_2C_2O_4$ 22.6, 6.52, 19.4, 51.4

4. Empirical Formula

a. Calculate empirical formula of a compound that contains 1.67g Ce and 4.54g I. CeI_3

b. Calculate EF for a compound that is 68.8% C, 4.95% H, and 26.2% O by mass. $C_7H_6O_2$ 47

c. The EF of a compound is CHOCl. The molar mass of the compound is $\frac{129\ g}{mole}$. Calculate and determine the molecular formula. $C_2H_2O_2Cl_2$

Find the formula for the hydrate that contains 0.737g $MgSO_3$ and 0.763g H_2O.

$MgSO_3 \cdot \underline{6}\ H_2O$ ~~$MgSO_3 \cdot 0.763$~~

49

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

28.02 80

N_2O, NO, N_2O_5, NO_2, N_2O_3

108.02

25.94% N

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

equal Al and Mg

Calculate atoms in 0.5g Ca 22

7.51×10^{21} atoms Ca

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

Calculate the molar mass of magnesium Sulfate hepta hydrate. 23

24.31 64 126.112

$MgSO_4 \cdot 7H_2O$

32.07

246.492

246.492

24

$H_2C=C-C=CH_2$ (C_4H_6)

15 The molecule with only two double bonds is

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

e) C_6H_6

25

16 Select the planar molecule

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

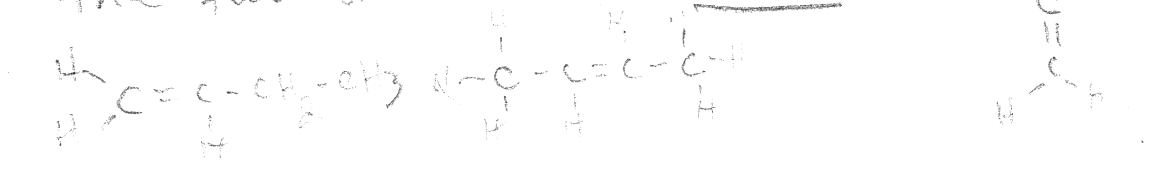
e) NI_3

26

Fe

17 Determine effective nuclear charge for Fe 3d electrons. $Z = +6$

18 Given $CH_2=CHCH_2CH_3$, Draw its L.S, then the two additional isomers:



(4)

Draw the following L.S.

- $HCOOH$ CH_3COOH CH_3CH_2COOH

Herve

27

Which of the following has only one unshared pair of e⁻?

a) I_2

b) N_2

c) PH_3

d) CBr_4

e) Cl_2O

a

28

Based on the following ionization energies, element X is?

1st	2nd	3rd	4th	5th	6th
1060	1890	2905	4950	6270	21,200

a) Na b) Mg c) Al d) Si e) P

12 Identify all the hyb in:

sp^2 29

Which molecule has the largest dipole moment? 30

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

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) Tr bipyramid e) T-shaped