Review sheet for AP Chemistry Unit 1 Test

1. The formula of the precipitate from the reaction between Zinc Sulfate and Tin(II) Fluoride is $Sn SO_4$

2. Among Ammonia, Zinc and Sodium bicarbonate the compound that produce Hydrogen gas upon reaction with Hydrochloric acid is Zn

3. A sample of solution has a mixture of 0.01 M Aluminum Chloride and 0.05 M Magnesium chloride, what is the molarity of Silver ~~Chloride~~ that is required to precipitate all the chloride ions present in the solution is $0.13 \, moles \, AgNO_3$

4. 50 grams of Aluminum Sulfate is dissolved in 500 mL of water the particle concentration of Aluminum and Sulfate ions are $[Al^{+3}] = 0.584 M$ $[SO_4^{-2}] = 0.876 m$

5. What is the maximum amount of Carbondioxide that is absorbed by 0.02 molar of 100 mL of Sodium hydroxide solution. $0.044 g \, CO_2$

6. If 4.2 grams of Magnesium carbonate produced only 1.5 grams of Carbondioxide, then what is %purity of Magnesium carbonate. 68.1% $2.2 g \, CO_2$ should have been produced

7. The best glassware used to prepare standard solutions in the chemistry lab are $Volumetric \, flask$

8. Name the cations and anions whose aqueous solutions are always soluble. NO_3^-, IA . . .

9. What is volume of 0.05 Molar Sulfuric acid required to neutralize 20 mL of 0.1 Molar Sodium Hydroxide. $20 mL$

10. Write the balanced equation between Calcium Carbonate and Hydrobromic acid.

11. Aluminum is heated strongly in air to form a mixture of Aluminum Oxide and Aluminum Nitride, what is the oxidation number of Aluminum before and after the reaction. $0 \rightarrow +3$

12. if equal volumes of 0.5 molar Lead nitrate and Potassium Iodide are mixed together after the formation of the precipitate, what is the ion left with highest concentration? Write the word equation, balance, write ionic and net ionic equation. NO_3^- / $Pb^{+2} + 2I^- \rightarrow PbI_2$

13. Dichromate ion reacts with Nitrate ion in acid medium and form nitrate, Chromium(III) ion and water. Write the ionic equation. What is the ion that is oxidized? What is the oxidation state of Chromium in Dichromate ion? Balance the equation. In the above process 46 mL of 0.062 molar Dichromate was initially used to react with nitrate. The remaining dichromate(excess) is determined by using 19.3 mL of 0.22M of Iron(II)nitrate and the reaction is given as below.

$6 \, Fe^{2+}(aq) + Cr_2O_7^{2-}(aq) + 14 \, H^+(aq) \rightarrow 2 \, Cr^{3+}(aq) + 6 \, Fe^{3+}(aq) + 7 \, H_2O(l)$
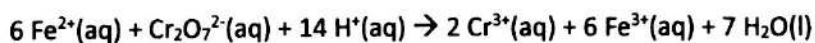
Calculate the moles of Dichromate reacted with nitrate ion, excess dichromate left.

ER   LR

14. Equimolar quantities of Magnesium nitrate and Sodium fluoride are allowed to react. What is the — Yes
limiting reagent and excess? Copper metal is added to Silver nitrate solutions, is the reaction possible?
Justify. Ag^+ has higher Reducing

C_2H_6 15. Calculate the number of Hydrogen atoms in 3 grams of Ethane. ($0.1 \times 6 \times 6.02 \times 10^{23}$)

16. if equal masses of Hydrogen and Oxygen are allowed to react to form water, what mass of excess
reagent would be left? 28 g H_2 (ER) will be left if we start with
32 g each.

17. When Zinc reacts with nitric acid, predict the products, write the ionic equation and balance.
$4 Zn + 10 H^+ + 10 NO_3^- \rightarrow 4 Zn^{+2} + NO_3^- + NH_4^+ + 3 H_2O$

18. what is the maximum number of moles of Iron(III) oxide produced by the reaction of 0.4 moles each
of Iron and Oxygen. 0.2 mole Fe_2O_3

19. how many atoms of each element are present in 1 mole of potash alum. $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24 H_2O$

20. 3.42 grams of sucrose is dissolved in 100 mL solution, the molarity is 1 M

21. Potassium permanganate reacts with oxalic acid in acid medium to produce Carbondioxide,
how many moles of Carbondioxide are produced by the reaction of 40 mL of 0.4 M Potassium
permanganate and 100 mL 0.2 M Oxalic acid. ~~0.008~~ 0.04

22. An oxide of Aluminum has 54% Al approximately, the empirical formula of the oxide is
Al_2O_3

23. Write the balanced equation between Baking soda and king of Chemicals. $2 NaHCO_3 + H_2SO_4$
$\rightarrow Na_2SO_4 + 2H_2O + CO_2$

24.What mass of HCl is produced by the reaction of 3.0×10^{23} molecules of Chlorine with excess H_2
$36.5 g$

25. A hydrocarbon on combustion produce Carbondioxide and water in 1 to 2 ratio, predict the formula
of the hydrocarbon. CH_4 , $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

26. Sodium reacts with Fluorine to form Sodium Fluoride, name some other elements that combine with
Fluorine in the same ratio. KF , RbF

27. Name Pb_2O and calculate the oxidation state of Pb.   Lead (I) Oxide
$+1$

(24) 3×10^{23} molecules of chlorine is $\frac{1}{2}$ mole Cl_2

$\frac{1}{2}$ mole of Cl_2 will produce 1 mole HCl per
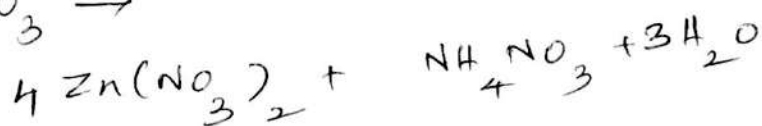equation

$\frac{1}{2} H_2 + \frac{1}{2} Cl_2 \rightarrow HCl$

(20) 3.42 g Sucrose is 0.01 mole
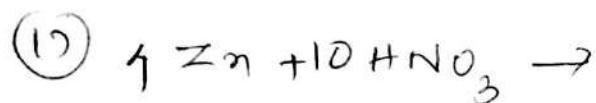
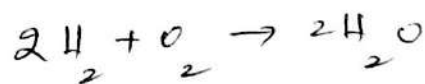(19) $K_2SO_4 \, Al_2(SO_4)_3 \, 24H_2O$

Imole has 2 mole K , 2 mole Al   48 mole H
           4 mole S , 40 mole O

(18) $4Fe + 3O_2 \rightarrow 2Fe_2O_3$ Therefore Fe is LR

$\dfrac{0.4}{4} = 0.1$ $\dfrac{0.4}{3} = 0.13$ $\dfrac{0.4 \text{ mole Fe}}{} \bigg| \dfrac{2Fe_2O_3}{4Fe}$

(17) $4Zn + 10HNO_3 \rightarrow$

$\quad\quad 4Zn(NO_3)_2 + NH_4NO_3 + 3H_2O$

(16) Assume 32g each of H_2, O_2
16 mole H_2, 1 mole O_2 $2H_2 + O_2 \rightarrow 2H_2O$

                    $O_2 - LR$

36g of H_2O can be made., only 4 g of H_2
is need , so 28g H_2 left unreacted
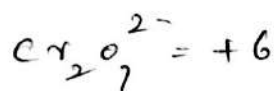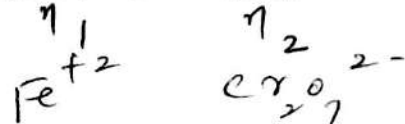
(15) $Cr_2O_7^{2-} + 2NO_2^- + 10H^+ \rightarrow 2Cr^{+3} + 2NO_3^- + 5H_2O$
                    2

NO_2^- - Oxidized $Cr_2O_7^{2-} = +6$

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$\dfrac{V_1 M_1}{n_1} = \dfrac{V_2 M_2}{n_2}$ <u>Initial dichromate</u>

Fe^{+2} $Cr_2O_7^{2-}$ $0.046 \times 0.062 = 0.00285$
                                                    moles

$\dfrac{0.0193 \times 0.22}{6} = \dfrac{n_{Cr_2O_7^{2-}}}{1}$ 19.3 mL of 0.22 M Fe^{+2}
                                        is required to react
                                        with remaining , That
$n_{Cr_2O_7^{2-}}$ That reacts   means remaining moles
with Fe^{+2}, that means   of dichromate ion are are
excess $Cr_2O_7^{2-}$ are =   Rem Dichromate reacted with nitrate
              4                      $0.00285 - 0.0007 = 0.00215$
           7×10^{-4}

(9) $\dfrac{V \times 0.05}{1} = \dfrac{20 \times 0.1}{2}$ $V = \dfrac{1}{0.05}$

(12)

$0.5m\ Pb^{+2} + 1m\ NO_3^- + 0.5m\ K^+ + 0.5m\ I^-$

$\left(Pb(NO_3)_2 \rightleftharpoons Pb^{+2} + 2NO_3^-\right)$ $\left(KI \rightleftharpoons K^+ + I^-\right)$

$\longrightarrow PbI_2 + 1m\ NO_3^- + 0.5m\ K^+$

Net Ionic $Pb^{+2} + 2I^- \longrightarrow PbI_2 (s)$

(26) $C_2H_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

(21) $2KMnO_4 + 5H_2C_2O_4 + 3H_2SO_4$

$\rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2$

# of moles of $KMnO_4 = 0.04 \times 0.4 = 0.016$

$\dfrac{0.016}{2} = 0.008$
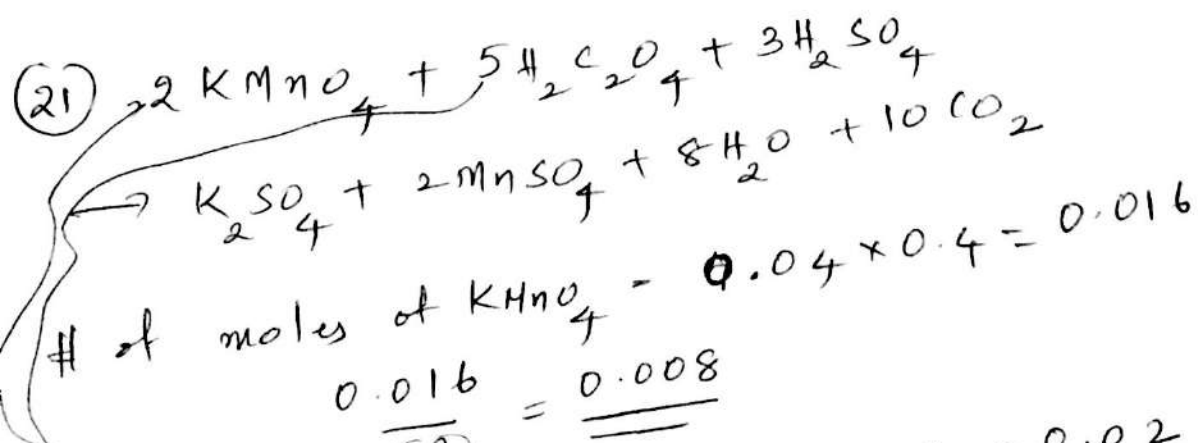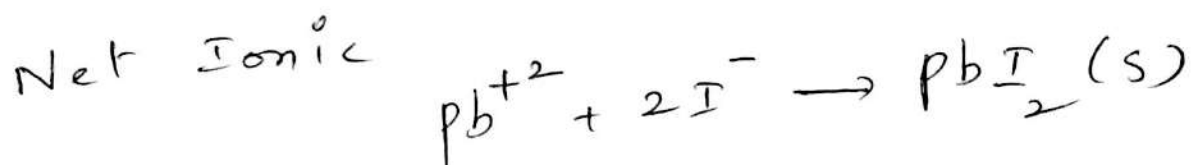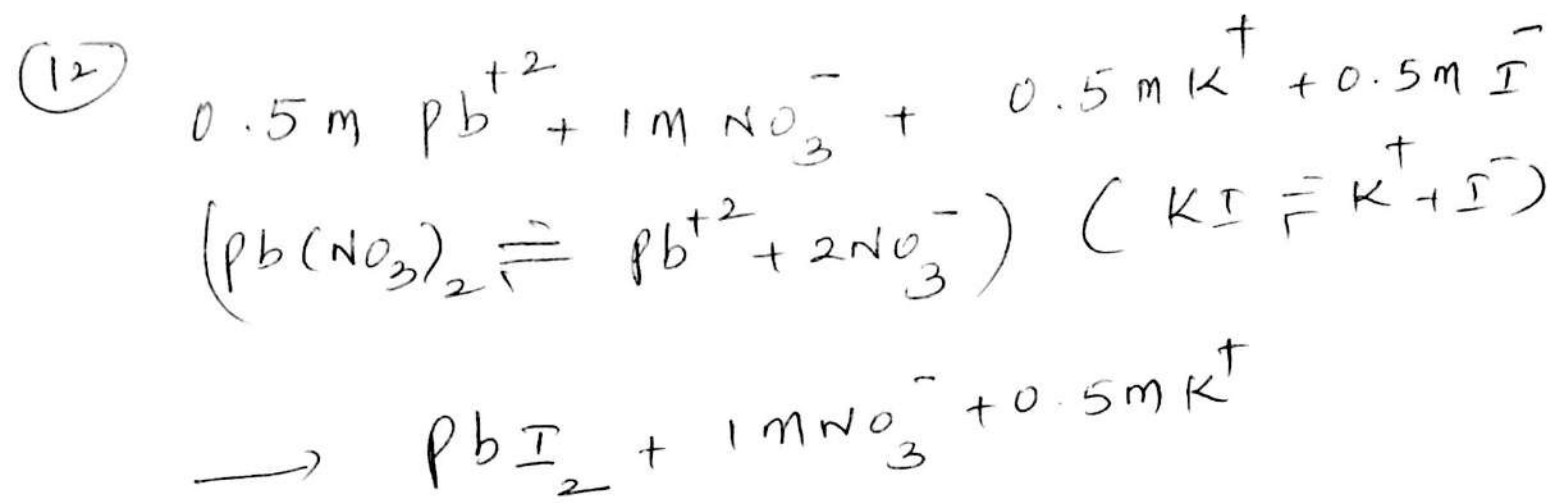
# of mole of $H_2C_2O_4 = \dfrac{100 \times 0.2}{1000} = 0.02$

$\dfrac{0.02}{75} = 0.009\ mole$

$\dfrac{0.02}{mole\ H_2C_2O_4}\bigg| \dfrac{10\ CO_2}{5\ H_2C_2O_4}$

Therefore $H_2C_2O_4$ is LR