Exam 4 Test Prep

Chapter 1

Find the mass of 250.0mL of benzene. The density of benzene is 0.8765g/mL.

Determine the number of sig figs for each number:

0.025 6.20×10^3 100

Determine if it is a pure element, pure substance, or mixture (homogenous or heterogeneous):

Brass Magnesium Water Soil

Chapter 2

Calculate how many protons, neutrons, and electrons for each compound:

Name	Protons	Neutrons	Electrons
Selenium			
Carbon-12			
F^{3-}			
Ca^{2+}			

Write the formula for the following compounds:

Magnesium oxide Sodium phosphate Sulfur dibromide

Name the following compounds:

NO_2 $MgBr_2$

Chapter 3 Part 1:

Balance the chemical equation:

H_3PO_4 + _____ KOH ⟶ _____ K_3PO_4 + _____ H_2O

Iodine is 80.0% ^{127}I, 17.0% ^{126}I, and 3.00% ^{128}I. Calculate the average atomic mass of iodine.

Calculate the percent composition of calcium in Ca_3P_2?

Chapter 3 Part 2:

$2\ KClO_3 \longrightarrow 2\ KCl + 3\ O_2$

How many grams of O_2 will be formed from 3.76 grams of $KClO_3$?

The empirical formula of a substance is CH_2O. It's molar mass is 180. grams. What is the molecular formula?

What is the empirical formula of a compound consists if 89.14% Au and 10.80% of O.

Chapter 4 Part 1:

Determine if each compound is a strong, weak , or nonelectrolyte:

$Ca(OH)_2$ CH_3CH_2OH HF HNO_3

Write the net ionic equation for the precipitation reaction. What are the spectator ions?

$NaCl_{(aq)} + AgNO_{3(aq)} \rightarrow NaNO_{3(aq)} + AgCl_{(s)}$

Chapter 4 Part 2:

Determine what compound is reduced and oxidized.

$Mg + 2\ HCl \longrightarrow H_2 + MgCl_2$

Determine the oxidation number:

N in N_2O_3

C in CH_4

C in $C_2O_4^{2-}$

Mn in $KMnO_4$

What volume of a 18.0 M H_2SO_4 stock solution would you use to prepare 500. mL of a 1.77 M H_2SO_4 solution?

If it takes 10.0 mL of 2.0 M HNO_3 to neutralize 30.0 mL of $Ca(OH)_2$, what is the molar concentration of $Ca(OH)_2$?

$CH_4 + 2\ H_2O \longrightarrow 4\ H_2(g) + CO_2(g)$

How many grams of hydrogen can be produced from the reaction of 80.0 g of CH_4 and 16.3 g of water? What is the limiting reactant?

Chapter 5 Part 1:

Determine if it is an endothermic or exothermic reaction:

Boiling water Freezing water Melting chocolate Combustion

500 J of heat is added to the system and 200 J of work is done by the system. Calculate the change in internal energy of the system.

Chapter 5 Part 2:

Given the thermochemical equation:

$N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$ $\Delta H = -91.8$ kJ

How much heat is given off when 1.00 g of H_2 reacts?

14.0g of metal at 24.0 °C has 250. joules of heat added to it. The metal's specific heat is 0.105 J/g°C. What is its final temperature?

Calculate the ΔH for the reaction $CH_4\ (g) + NH_3\ (g) \rightarrow\ HCN\ (g) + 3\ H_2\ (g)$, given:

$N_2\ (g) + 3\ H_2\ (g) \rightarrow 2\ NH_3\ (g)$ $\Delta H = -91.8$ kJ

$C\ (s) + 2\ H_2\ (g) \rightarrow CH_4\ (g)$ $\Delta H = -74.9$ KJ

$H_2\ (g) + 2\ C\ (s) + N_2\ (g) \rightarrow 2\ HCN\ (g)$ $\Delta H = +270.3$ KJ

Calculate the enthalpy change of the reaction below:

$CH_4(g) + 2\ O_2(g) \rightarrow\ CO_2(g) + 2\ H_2O(l)$

Compound	Enthalpy of Formation (kJ/mol)
Hydrogen (H_2)	0
Methane (CH_4)	-74.6
Ethane (C_2H_6)	-84.0
Ethylene (C_2H_4)	52.4
Carbon Dioxide	-393.5
Water (l)	-286
Water (g)	-241.8

Calculate the enthalpy change given the table below:

$CH_4(g) + 2\ O_2(g) \rightarrow\ CO_2(g) + 2\ H_2O(l)$

Bond	Energy (kJ/mol)
O=O	495
C=O	745
O-H	467
C-H	413

Chapter 10:

A submarine with a volume of 1.2×10^5 L has an internal pressure of 1.0 atm and an internal temperature of 15° C. If the submarine descends to a depth where the pressure is 150 atm and the temperature is 3.0° C, what will the volume of the gas inside be if the hull of the submarine breaks?

At what temperature will 5.00g of Cl_2 exert a pressure of 900. Torr at a volume of 750. mL?

Ammonia is often formed by reacting nitrogen and hydrogen gases. How many liters of ammonia gas can be formed from 24.5 L of hydrogen gas at 93.0 °C and a pressure of 33.9 kPa?

A container with two gases, helium and argon, is 30.0% helium. Calculate the partial pressure of helium and argon if the total pressure inside the container is 4.00 atm.

A sample of nitrogen gas (N_2) is contained in a 5.00 L container at a temperature of 300 K and a pressure of 2.00 atm. Calculate the density of the nitrogen gas.

Chapter 11:

Rank the following compounds from weakest intermolecular forces to strongest.

O_2 , H_2S, and CH_3OH.

Which of the following will have the highest melting point?

CH_4 or C_2H_5OH

Rank the following in order of increasing boiling point:

Ne, $CH_3C(CH_3)_2CH_2CH_3$, C_6H_{14}, NH_3, HCl

Which compound below is most likely to dissolve best in water?

Carbon tetrachloride or ammonia

Chapter 8, 9	Phosphate
Lewis Dot Structure	
Formal Charge	
# e- domains	
e- domain geometry	
Molecular geometry	
Bond Angle	
Hybridization	
Polar or Nonpolar Molecule	
Polar or Nonpolar bonds	
Sigma and pi bonds	

Chapter 6:

A light has a wavelength of 500. nm. What is the frequency of the light wave?

A photon of light has a wavelength of 400. nm. Calculate the energy of the photon.

Determine the electron configuration of the following elements:

Cr:

Cl^-:

Mg^+:

Determine the condensed electron configuration for the following element:

Se