Mole Unit Review

a. H_2O

Complete the following questions on a separate sheet of paper. Ensure all work is shown!

c. AgNO₃

e. $Al_2(SO_4)_3$

1. Calculate the molar mass of each of the following:

2. Calculate the mass of the following: a. 4.50 mol of NH ₄ Cl b. 3.25 mol of PCl ₃ d. 0.0125 mol of XeF ₄ 3. Calculate the number of moles in the following: a. 225 g of (NH ₄) ₂ SO ₄ c. 2955 kg of Ag b. 55.2 mg of Cl ₂ d. 0.0845 g of KMnO ₄ 4. Calculate the molar mass of each of the substances mentioned in the following: a. A 0.250 mol sample of methane has a mass of 4.00 g. b. A 0.00248 mol sample of cholesterol has a mass of 0.947 g. 5. Calculate the number of moles contained in each of the following: a. 7.50 x 10 ²¹ molecules of HNO ₃ c. 10.6 L of SO _{2(g)} at STP b. 425 mg of Ca(OH) ₂ d. 0.950 kg of NaOH 6. Calculate the volume of the following gases at STP: a. 0.235 mol of B ₂ H _{6(g)} b. 2.55 x 10 ³ mol of C ₂ H _{6(g)} 7. Calculate the mass of each of the following: a. 0.125 mol of CO ₂ b. 5.48 mol of FeCl ₃ 8. Calculate the mass of 1 mol of each of the following: a. Na ₂ B ₄ O ₇ ·10H ₂ O b. Cu ₃ (OH) ₂ (CO ₃) ₂ 9. An unknown gas sample contains only one of the compounds SO ₃ , CH ₄ , NF ₃ , or C ₂ H ₂ . If 1 molecule of the gas has a mass of 4.32 x 10 ⁻²³ g, which type of molecule is contained in the sample? 10. How many atoms are contained in 1 molecule of each of the following? a. CH ₃ CO ₂ H b. NH ₄ Cl c. (CH ₃) ₂ CO 11. How many atoms are contained in the following? a. 5 molecules of C ₆ (ClO ₄) ₂ ·6H ₂ O		b.	NH_3	d. $Sn(C_2O_4)_2$		f. CH ₃ COOH				
b. 3.25 mol of PCl ₃ 3. Calculate the number of moles in the following: a. 225 g of (NH ₄) ₂ SO ₄ b. 55.2 mg of Cl ₂ 4. Calculate the molar mass of each of the substances mentioned in the following: a. A 0.250 mol sample of methane has a mass of 4.00 g. b. A 0.00248 mol sample of cholesterol has a mass of 0.947 g. 5. Calculate the number of moles contained in each of the following: a. 7.50 x 10 ²¹ molecules of HNO ₃ b. 425 mg of Ca(OH) ₂ c. 10.6 L of SO _{2(g)} at STP d. 0.950 kg of NaOH 6. Calculate the volume of the following gases at STP: a. 0.235 mol of B ₂ H _{6(g)} b. 2.55 x 10 ³ mol of C ₂ H _{6(g)} 7. Calculate the mass of each of the following: a. 0.125 mol of CO ₂ b. 5.48 mol of FeCl ₃ 8. Calculate the mass of 1 mol of each of the following: a. Na ₂ B ₄ O ₇ ·10H ₂ O b. Cu ₃ (OH) ₂ (CO ₃) ₂ 9. An unknown gas sample contains only one of the compounds SO ₃ , CH ₄ , NF ₃ , or C ₂ H ₂ . If 1 molecule of the gas has a mass of 4.32 x 10 ⁻²³ g, which type of molecule is contained in the sample? 10. How many atoms are contained in 1 molecule of each of the following? a. CH ₃ CO ₂ H b. NH ₄ Cl c. (CH ₃) ₂ CO 11. How many atoms are contained in the following? a. 5 molecules of C ₆ H ₂ Cl ₄	2.	Calcula	ite the mass of the following:							
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b. 10 molecules of Co(ClO ₄) ₂ ·6H ₂ O		a.	5 molecules of C ₆ H ₂ Cl ₄							
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12.	Find th	e mass in grams of each of the fol	lowii	ng:						
	a.	2 x 106 CO molecules					c.	175 N atoms		
	b.	1 KOH molecule					d.	$1.25 L of NH_{3(g)}$ at STP		
13. How many atoms are contained in each of the following?										
	a.	$12\ g\ of\ H_2O_2$	c.	5.0 g	of N	aCl		e. 6.5 x 10 ⁻⁶ g of Kr		
	b.	40.0 g of K	d.	125 g	of (CH₃C	l			
14.	What v	volume at STP is occupied by eac	h of	the fol	low	ing?				
	a.	16.5 g of AsH _{3(g)}				b.	5	$.65 \times 10^{22}$ molecules of POF _{3(g)}		
15.	How m	nany atoms of N are there in 30.0	g of	f NH ₄ N	03?					
16.	Calcula	ate the percentage composition o	of the	e follov	wing	g:				
	a.	C_2H_6	b.	$FeCl_3$				c. CaCO ₃		
17.	Find th	ne empirical formula for the follo	wing	g comp	our	ıds:				
	a.	15.9% B, 84.1% F					c.	46.2% C, 7.69% H, 46.2% O		
	b.	70.0% Fe, 30.0% O					d.	50.5% C, 5.26% H, 44.2% N		
18.	If 0.85	nas the empirical formula CH ₂ . O L of the gas at STP has a mass g, what is the molecular a?	STP has a mass olecular			contai	tair v m	t volume of 2.8 x 10^{-2} M NaF ains 0.15 g of NaF? many grams of CaCl $_{\rm 2}$ are		
19.	C ₅ H ₁₁ .	pound has an empirical formula If 0.0275 mol of the compound nass of 3.91 g, what is the ular formula of the compound?						ained in 225 mL of 0.0350 M ₂ solution?		
20.	and ox the gas	mol of a gas containing carbon ygen has a mass of 1.68 g. If is 42.9% C, what is the cal and molecular formula of ?								
21.	 Calculate the molar concentration of the following solutions: 									
	a.	0.26 mol of HCl in 1.0 L of solution								
	b.	$2.8 \text{ mol of } HNO_3 \text{ in } 4.0 \text{ L of solution}$								
	C.	25.0 g of NaCl in 250.0 mL of solution								
22.		nany moles of AlCl3 are ned in 350.0 mL of 0.250 M								

AlCl₃?