

Please follow the instructions for each section of the exam. Show your work on all mathematical problems. Provide answers with the correct units and significant figures. Be concise in your answers to discussion questions. Point values are in parentheses by each problem.

Part 0: Warmup. 4 points each

1. Choose the INCORRECT statement:

- a. Most molecular compounds are either non-electrolytes or weak electrolytes.
- b. Most ionic compounds are strong electrolytes.
- c. Net ionic equations include only the actual participants in the reaction.
- d. An acid produces hydride ions in solution.

Answer _____ **d** _____

2. If someone were to light a cigar at one end of a closed room, persons on the other end of the room might soon perceive an odor due to gaseous emissions from the cigar. Such a phenomenon is an example of:

- a. ideality
- b. diffusion
- c. dissolution
- d. effusion

Answer _____ **b** _____

Part I: Complete all of problems 3-8

3. Compare the following using a maximum of three sentences for each pair of terms.
a. **strong electrolyte** versus **weak electrolyte**. (5)

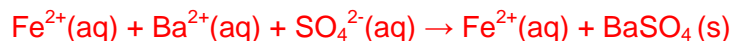
Strong electrolytes are ionic compounds that dissociate completely into their component ions in solution. In a solution of a weak electrolyte, not all of the electrolyte compound dissociates.

b. **ideal gas** versus **non-ideal (or real) gas**: (5)

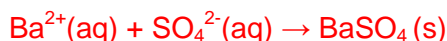
Ideal gases do not interact with one another, are small in volume compared to the total volume the gas occupies, and undergo elastic collisions. Real gases do undergo interactions, inelastic collisions, and have finite volume.

4. It is possible to use precipitation reactions to separate ions in solution by removing target ions as insoluble salts. Propose an approach to separate Fe^{2+} from Ba^{2+} using precipitation reactions. Include balanced reactions (indicating states of products and reactants). (10)

One possibility is to take advantage of the fact that barium forms an insoluble salt with sulfate, but iron does not. Therefore, if a solution containing sulfate ion is added to a solution containing Fe^{2+} and Ba^{2+} , we would expect the formation of insoluble barium sulfate, as shown below:



or

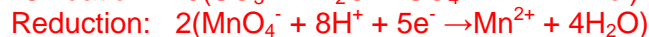
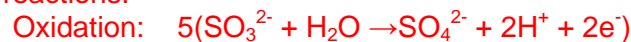


FORM A

5. Answer the following based on the reaction: $\text{SO}_3^{2-} + \text{MnO}_4^- \rightarrow \text{SO}_4^{2-} + \text{Mn}^{2+}$

- What is the oxidation state of manganese in the permanganate ion? +7 (2)
- What is the oxidation state of sulfur in the sulfite ion? +4 (2)
- Balance the reaction in acidic aqueous solution. (8)

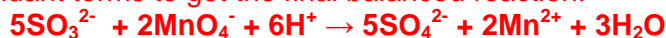
First balance the half reactions:



Now add half reactions together, ensuring that electrons will cancel.



Finally, cancel redundant terms to get the final balanced reaction.



6. A 1.27 g sample of an oxide of nitrogen, believed to be either NO or N_2O , occupies a volume of 1.07 L at 25°C and 737 mm Hg. Which oxide is it? (10)

If we can determine the molar mass, we can identify the oxide. How many moles is 1.27g?
Use the ideal gas law: $n = PV/RT$

$$P = 737 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mm Hg}} = 0.969_7 \text{ atm}$$

So,

$$n = \frac{0.969_7 \text{ atm} \times 1.07 \text{ L}}{0.08206 \text{ L atm/mol K} \times 298 \text{ K}} = 0.0424_3 \text{ moles}$$

And,

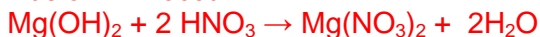
$$\text{molar mass} = \frac{1.27 \text{ g}}{0.0424_3 \text{ moles}} = 29.9_3 \text{ g mol}^{-1}$$

Looking at our two oxides, NO has a molar mass of $29.9_3 \text{ g mol}^{-1}$ and N_2O has a molar mass of $44.0_1 \text{ g mol}^{-1}$. Therefore, the oxide must be NO.

FORM A

7. A 0.755 gram sample of solid magnesium hydroxide is added to 125 mL of a 0.444 M solution of nitric acid. Will the resulting solution be acidic, basic, or neutral? Justify your answer. (10)

The neutralization reaction below will occur:



One approach is to calculate how much nitric acid will be required to neutralize all of the magnesium hydroxide.

$$0.755 \text{ g Mg(OH)}_2 \times \frac{1 \text{ mol Mg(OH)}_2}{58.320 \text{ g}} \times \frac{2 \text{ mol HNO}_3}{1 \text{ mol Mg(OH)}_2} \times \frac{1 \text{ L HNO}_3}{0.444 \text{ mol HNO}_3} = 0.0583 \text{ L}$$

So, we would need 58.3 mL nitric acid to consume all of the magnesium hydroxide. Since we have 125 mL, there is an excess of nitric acid, meaning there will be nitric acid left after the reaction is complete, causing the resulting solution to be **acidic**.

8. How does the kinetic-molecular theory of gases help explain why a helium-filled balloon shrinks if it is taken outside on a cold winter day? (10)

As the temperature decreases, the velocity of gas particles decreases as well. This leads to a decrease in both the frequency and intensity of collisions of gas particles with the walls of the balloon. Since it is these collisions that result in pressure, this leads to a decrease in pressure as well. As the pressure decreases, so does the volume of the balloon.

FORM A

Part II. Answer two (2) of problems 9-12. Clearly mark the problems you do not want graded. 15 points each.

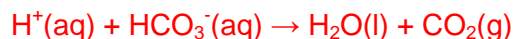
9. Write balanced overall reactions and net ionic equations for each of the following: Indicate the state (s, l, g, aq) of each of the reactants and products.

a. Aqueous sulfuric acid is mixed with aqueous sodium bicarbonate

Balanced Reaction: (5)



Net Ionic Equation: (2)



b. Aqueous lead (II) nitrate is mixed with aqueous lithium hydroxide

Balanced Reaction: (5)



Net Ionic Equation: (2)



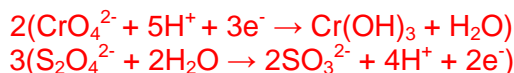
10. Sodium dithionite, $\text{Na}_2\text{S}_2\text{O}_4$, is an important reducing agent. One interesting use is in the purification of wastewater by the reduction of chromate ion with $\text{S}_2\text{O}_4^{2-}$ in basic solution to form insoluble chromium (III) hydroxide, with sulfite ion produced as another product.

a. Write the balanced reaction for the process occurring in basic solution. (10)

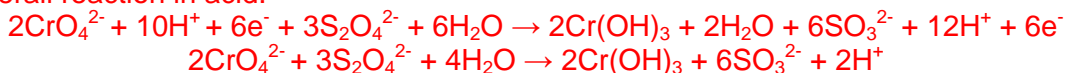
Unbalanced Reaction:



Half Reactions:



Overall reaction in acid:



Overall reaction in base:



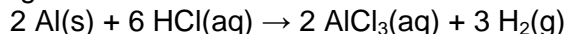
- b. What mass of $\text{Na}_2\text{S}_2\text{O}_4$ is consumed in a reaction with 100.0 L of wastewater having $[\text{CrO}_4^{2-}] = 0.0148 \text{ M}$? (5)

$$100.0 \text{ L} \times \frac{0.0148 \text{ mol CrO}_4^{2-}}{1\text{L}} \times \frac{3 \text{ mol S}_2\text{O}_4^{2-}}{2 \text{ mol CrO}_4^{2-}} \times \frac{1 \text{ mol Na}_2\text{S}_2\text{O}_4}{1 \text{ mol S}_2\text{O}_4^{2-}} = 2.22 \text{ mol Na}_2\text{S}_2\text{O}_4$$

$$2.22 \text{ mol Na}_2\text{S}_2\text{O}_4 \times \frac{174.109 \text{ g Na}_2\text{S}_2\text{O}_4}{\text{mol Na}_2\text{S}_2\text{O}_4} = 386.52 \text{ g} = \mathbf{387 \text{ g Na}_2\text{S}_2\text{O}_4}$$

FORM A

11. Birmabright is a metal alloy consisting of aluminum, magnesium, and manganese. A 0.273 g sample of Birmabright is dissolved in an excess of hydrochloric acid, producing hydrogen gas as shown in the balanced reaction below. If 355 mL of hydrogen is collected over water at a temperature of 25°C and pressure of 755 mm Hg, what is the mass percent of aluminum in Birmabright?



Since the gas was collected over water, $P_{\text{total}} = P_{\text{H}_2} + P_{\text{H}_2\text{O}}$. The vapor pressure of water at 25°C is 23.75 mm Hg. Therefore, $P_{\text{H}_2} = (755 - 23.75) \text{ mm Hg} = 731 \text{ mm Hg}$.

Now we can find the number of moles of H_2 produced ($n = PV/RT$)

$$P = 731 \text{ mm Hg} \times \frac{1 \text{ atm}}{760 \text{ mm Hg}} = 0.961_8 \text{ atm}$$

So,

$$n = \frac{0.961_8 \text{ atm} \times 0.355 \text{ L}}{0.08206 \text{ L atm/mol K} \times 298 \text{ K}} = 0.0139_6 \text{ moles H}_2$$

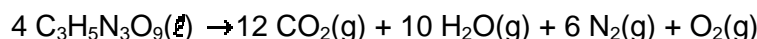
So, the mass of aluminum consumed must have been:

$$0.0139_6 \text{ moles H}_2 \times \frac{2 \text{ mol Al}}{3 \text{ mol H}_2} \times \frac{26.9815 \text{ g Al}}{1 \text{ mol Al}} = 0.251_1 \text{ g Al}$$

And the percent aluminum must be:

$$\frac{0.251_1 \text{ g Al}}{0.273 \text{ g sample}} \times 100\% = \mathbf{92.0\% \text{ Aluminum}}$$

12. Nitroglycerine ($\text{C}_3\text{H}_5\text{N}_3\text{O}_9$, molar mass = 227.088 g/mol) is a contact explosive that rapidly decomposes via the reaction below and releases a large quantity of heat and gas. Assume 10.0 grams of nitroglycerine decomposes in a 2.0 L soda bottle and instantaneously generates a temperature of 5230K.



- a. What will the pressure be inside the bottle once the reaction is complete? (5)

First find the total number of moles of gas produced:

$$10.0 \text{ g C}_3\text{H}_5\text{N}_3\text{O}_9 \times \frac{1 \text{ mol C}_3\text{H}_5\text{N}_3\text{O}_9}{227.088 \text{ g}} \times \frac{29 \text{ mol gas}}{4 \text{ mol C}_3\text{H}_5\text{N}_3\text{O}_9} = 0.319_3 \text{ mol gas}$$

Now find the pressure

$$P = \frac{nRT}{V} = \frac{(0.319_3 \text{ mol})(0.08206 \text{ L atm/mol K})(5230 \text{ K})}{2.0 \text{ L}} = 68.5_1 \text{ atm} = \mathbf{69 \text{ atm}}$$

- b. What is the partial pressure of carbon dioxide when the reaction is complete? (5)

$$P_{\text{CO}_2} = \frac{n_{\text{CO}_2} (P_{\text{total}})}{n_{\text{total}}} = \frac{12 \text{ mol CO}_2}{29 \text{ mol total}} \times 69 \text{ atm} = 28.5_5 \text{ atm} = \mathbf{29 \text{ atm}}$$

- c. What volume would the gas mixture produced occupy at STP? (5)

Use the combined gas law to find:

$$V_2 = \frac{P_1 V_1 T_2}{P_2 T_1} = \frac{(69 \text{ atm})(2.0 \text{ L})(273 \text{ K})}{(1 \text{ atm})(5230 \text{ K})} = \mathbf{7.2 \text{ L}}$$

FORM A
Possibly Useful Information

$R = 0.08206 \text{ L atm mol}^{-1} \text{ K}^{-1}$	STP = 1 atm, 0°C $K = 273.15 + ^\circ\text{C}$
1 atmosphere = 760 Torr = 760 mm Hg	$\left(P + \frac{n^2a}{V^2}\right)(V - bn) = nRT$
$P_{\text{total}} = n_{\text{total}}RT/V$	$P_A = X_A P_{\text{total}}$
$N_A = 6.02214 \times 10^{23} \text{ mol}^{-1}$	$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

Molar Masses	
Compound	Molar Mass (g/mol)
aluminum chloride	133.340
carbon dioxide	44.010
chromium (III) hydroxide	103.018
hydrochloric acid	36.461
hydrogen gas	2.016
magnesium hydroxide	58.320
nitric acid	63.013
nitrogen gas	28.0135
nitrogen monoxide	30.006
nitroglycerine	227.088
oxygen gas	31.999
sodium carbonate	105.989
sodium dithionite	174.109
sodium nitrite	68.995
water	18.015

**Vapor Pressure of Water
at Various Temperatures**

Temperature (°C)	Vapor Pressure (mmHg)
15.0	12.79
17.0	14.53
19.0	16.48
21.0	18.65
23.0	21.07
25.0	23.76
30.0	31.82
50.0	92.51

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TABLE 5.3 Some Common Gas-Forming Reactions

Ion	Reaction
HSO_3^-	$\text{HSO}_3^- + \text{H}^+ \longrightarrow \text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
SO_3^{2-}	$\text{SO}_3^{2-} + 2 \text{H}^+ \longrightarrow \text{SO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
HCO_3^-	$\text{HCO}_3^- + \text{H}^+ \longrightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
CO_3^{2-}	$\text{CO}_3^{2-} + 2 \text{H}^+ \longrightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
S^{2-}	$\text{S}^{2-} + 2 \text{H}^+ \longrightarrow \text{H}_2\text{S}(\text{g})$
NH_4^+	$\text{NH}_4^+ + \text{OH}^- \longrightarrow \text{NH}_3(\text{g}) + \text{H}_2\text{O}(\text{l})$

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TABLE 5.1 Solubility Guidelines for Common Ionic Solids

Follow the lower-numbered guideline when two guidelines are in conflict. This leads to the correct prediction in most cases.

1. Salts of group 1 cations (with some exceptions for Li^+) and the NH_4^+ cation are soluble.
2. Nitrates, acetates, and perchlorates are soluble.
3. Salts of silver, lead, and mercury(I) are insoluble.
4. Chlorides, bromides, and iodides are soluble.
5. Carbonates, phosphates, sulfides, oxides, and hydroxides are insoluble (sulfides of group 2 cations and hydroxides of Ca^{2+} , Sr^{2+} , and Ba^{2+} are slightly soluble).
6. Sulfates are soluble except for those of calcium, strontium, and barium.

FORM A																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Os 190.23			77 Ir 192.22			78 Pt 195.08			79 Au 196.967			80 Hg 200.59			81 Tl 204.383			82 Pb 207.2			83 Bi 208.980			84 Po (209)			85 At (210)			86 Rn (222)			87 Fr (223)			88 Ra 226.025			89 *Ac 227.028			90 Th 232.037			91 Pa 231.036			92 U 238.029			93 Np 237.048			94 Pu 244.064			95 Am 243.061			96 Cm 247.070			97 Bk 247.070			98 Cf 251.083			99 Es 252.083			100 Fm 257.103			101 Md 258.103			102 No 259.103			103 Lr 262.103			104 Rf (261)			105 Db (262)			106 Sg (266)			107 Bh (264)			108 Hs (277)			109 Mt (268)			110 Ds (271)			111 Rg (272)			112 Uub (285)			113 Uut (284)			114 Uuq (289)			115 Uup (291)			116 Uuh (293)			117 Uus (294)			118 Uuo (293)			119 Uut (294)			120 Uuq (298)			121 Uup (301)			122 Uuh (304)			123 Uus (309)			124 Uuo (310)			125 Uut (315)			126 Uuq (317)			127 Uup (318)			128 Uuh (317)			129 Uus (315)			130 Uuo (315)			131 Uut (317)			132 Uuq (317)			133 Uup (317)			134 Uuh (317)			135 Uus (317)			136 Uuo (317)			137 Uut (317)			138 Uuq (317)			139 Uup (317)			140 Uuh (317)			141 Uus (317)			142 Uuo (317)			143 Uut (317)			144 Uuq (317)			145 Uup (317)			146 Uuh (317)			147 Uus (317)			148 Uuo (317)			149 Uut (317)			150 Uuq (317)			151 Uup (317)			152 Uuh (317)			153 Uus (317)			154 Uuo (317)			155 Uut (317)			156 Uuq (317)			157 Uup (317)			158 Uuh (317)			159 Uus (317)			160 Uuo (317)			161 Uut (317)			162 Uuq (317)			163 Uup (317)			164 Uuh (317)			165 Uus (317)			166 Uuo (317)			167 Uut (317)			168 Uuq (317)			169 Uup (317)			170 Uuh (317)			171 Uus (317)			172 Uuo (317)			173 Uut (317)			174 Uuq (317)			175 Uup (317)			176 Uuh (317)			177 Uus (317)			178 Uuo (317)			179 Uut (317)			180 Uuq (317)			181 Uup (317)			182 Uuh (317)			183 Uus (317)			184 Uuo (317)			185 Uut (317)			186 Uuq (317)			187 Uup (317)			188 Uuh (317)			189 Uus (317)			190 Uuo (317)			191 Uut (317)			192 Uuq (317)			193 Uup (317)			194 Uuh (317)			195 Uus (317)			196 Uuo (317)			197 Uut (317)			198 Uuq (317)			199 Uup (317)			200 Uuh (317)			201 Uus (317)			202 Uuo (317)			203 Uut (317)			204 Uuq (317)			205 Uup (317)			206 Uuh (317)			207 Uus (317)			208 Uuo (317)			209 Uut (317)			210 Uuq (317)			211 Uup (317)			212 Uuh (317)			213 Uus (317)			214 Uuo (317)			215 Uut (317)			216 Uuq (317)			217 Uup (317)			218 Uuh (317)			219 Uus (317)			220 Uuo (317)			221 Uut (317)			222 Uuq (317)			223 Uup (317)			224 Uuh (317)			225 Uus (317)			226 Uuo (317)			227 Uut (317)			228 Uuq (317)			229 Uup (317)			230 Uuh (317)			231 Uus (317)			232 Uuo (317)			233 Uut (317)			234 Uuq (317)			235 Uup (317)			236 Uuh (317)			237 Uus (317)			238 Uuo (317)			239 Uut (317)			240 Uuq (317)			241 Uup (317)			242 Uuh (317)			243 Uus (317)			244 Uuo (317)			245 Uut (317)			246 Uuq (317)			247 Uup (317)			248 Uuh (317)			249 Uus (317)			250 Uuo (317)			251 Uut (317)			252 Uuq (317)			253 Uup (317)			254 Uuh (317)			255 Uus (317)			256 Uuo (317)			257 Uut (317)			258 Uuq (317)			259 Uup (317)			260 Uuh (317)			261 Uus (317)			262 Uuo (317)			263 Uut (317)			264 Uuq (317)			265 Uup (317)			266 Uuh (317)			267 Uus (317)			268 Uuo (317)			269 Uut (317)			270 Uuq (317)			271 Uup (317)			272 Uuh (317)			273 Uus (317)			274 Uuo (317)			275 Uut (317)			276 Uuq (317)			277 Uup (317)			278 Uuh (317)			279 Uus (317)			280 Uuo (317)			281 Uut (317)			282 Uuq (317)			283 Uup (317)			284 Uuh (317)			285 Uus (317)			286 Uuo (317)			287 Uut (317)			288 Uuq (317)			289 Uup (317)			290 Uuh (317)			291 Uus (317)			292 Uuo (317)			293 Uut (317)			294 Uuq (317)			295 Uup (317)			296 Uuh (317)			297 Uus (317)			298 Uuo (317)			299 Uut (317)			300 Uuq (317)			301 Uup (317)			302 Uuh (317)			303 Uus (317)			304 Uuo (317)			305 Uut (317)			306 Uuq (317)			307 Uup (317)			308 Uuh (317)			309 Uus (317)			310 Uuo (317)			311 Uut (317)			312 Uuq (317)			313 Uup (317)			314 Uuh (317)			315 Uus (317)			316 Uuo (317)			317 Uut (317)			318 Uuq (317)			319 Uup (317)			320 Uuh (317)			321 Uus (317)			322 Uuo (317)			323 Uut (317)			324 Uuq (317)			325 Uup (317)			326 Uuh (317)			327 Uus (317)			328 Uuo (317)			329 Uut (317)			330 Uuq (317)			331 Uup (317)			332 Uuh (317)			333 Uus (317)			334 Uuo (317)			335 Uut (317)			336 Uuq (317)			337 Uup (317)			338 Uuh (317)			339 Uus (317)			340 Uuo (317)			341 Uut (317)			342 Uuq (317)			343 Uup (317)			344 Uuh (317)			345 Uus (317)			346 Uuo (317)			347 Uut (317)			348 Uuq (317)			349 Uup (317)			350 Uuh (317)			351 Uus (317)			352 Uuo (317)			353 Uut (317)			354 Uuq (317)			355 Uup (317)			356 Uuh (317)			357 Uus (317)			358 Uuo (317)			359 Uut (317)			360 Uuq (317)			361 Uup (317)			362 Uuh (317)			363 Uus (317)			364 Uuo (317)			365 Uut (317)			366 Uuq (317)			367 Uup (317)			368 Uuh (317)			369 Uus (317)			370 Uuo (317)			371 Uut (317)			372 Uuq (317)			373 Uup (317)			374 Uuh (317)			375 Uus (317)			376 Uuo (317)			377 Uut (317)			378 Uuq (317)			379 Uup (317)			380 Uuh (317)			381 Uus (317)			382 Uuo (317)			383 Uut (317)			384 Uuq (317)			385 Uup (317)			386 Uuh (317)			387 Uus (317)			388 Uuo (317)			389 Uut (317)			390 Uuq (317)			391 Uup (317)			392 Uuh (317)			393 Uus (317)			394 Uuo (317)			395 Uut (317)			396 Uuq (317)			397 Uup (317)			398 Uuh (317)			399 Uus (317)			400 Uuo (317)			401 Uut (317)			402 Uuq (317)			403 Uup (317)			404 Uuh (317)			405 Uus (317)			406 Uuo (317)			407 Uut (317)			408 Uuq (317)			409 Uup (317)			410 Uuh (317)			411 Uus (317)			412 Uuo (317)			413 Uut (317)			414 Uuq (317)			415 Uup (317)			416 Uuh (317)			417 Uus (317)			418 Uuo (317)			419 Uut (317)			420 Uuq (317)			421 Uup (317)			422 Uuh (317)			423 Uus (317)			424 Uuo (317)			425 Uut (317)			426 Uuq (317)			427 Uup (317)			428 Uuh (317)			429 Uus (317)			430 Uuo (317)			431 Uut (317)			432 Uuq (317)			433 Uup (317)			434 Uuh (317)			435 Uus (317)			436 Uuo (317)			437 Uut (317)			438 Uuq (317)			439 Uup (317)			440 Uuh (317)			441 Uus (317)			442 Uuo (317)			443 Uut (317)			444 Uuq (317)			445 Uup (317)			446 Uuh (317)			447 Uus (317)			448 Uuo (317)			449 Uut (317)			450 Uuq (317)			451 Uup (317)			452 Uuh (317)			453 Uus (317)			454 Uuo (317)			455 Uut (317)			456 Uuq (317)			457 Uup (317)			458 Uuh (317)			459 Uus (317)			460 Uuo (317)			461 Uut (317)			462 Uuq (317)			463 Uup (317)			464 Uuh (317)			465 Uus (317)			466 Uuo (317)			467 Uut (317)			468 Uuq (317)			469 Uup (317)			470 Uuh (317)			471 Uus (317)			472 Uuo (317)			473 Uut (317)			474 Uuq (317)			475 Uup (317)			476 Uuh (317)			477 Uus (317)			478 Uuo (317)			479 Uut (317)			480 Uuq (317)			481 Uup (317)			482 Uuh (317)			483 Uus (317)			484 Uuo (317)			485 Uut (317)			486 Uuq (317)			487 Uup (317)			488 Uuh (317)			489 Uus (317)			490 Uuo (317)			491 Uut (317)			492 Uuq (317)			493 Uup (317)			494 Uuh (317)			495 Uus (317)			496 Uuo (317)			497 Uut (317)			498 Uuq (317)			499 Uup (317)			500 Uuh (317)			501 Uus (317)			502 Uuo (317)			503 Uut (317)			504 Uuq (317)			505 Uup (317)			506 Uuh (317)			507 Uus (317)			508 Uuo (317)			509 Uut (317)			510 Uuq (317)			511 Uup (317)			512 Uuh (317)			513 Uus (317)			514 Uuo (317)			515 Uut (317)			516 Uuq (317)			517 Uup (317)			518 Uuh (317)			519 Uus (317)			520 Uuo (317)			521 Uut (317)			522 Uuq (317)			523 Uup (317)			524 Uuh (317)			525 Uus (317)			526 Uuo (317)			527 Uut (317)			528 Uuq (317)			529 Uup (317)			530 Uuh (317)			531 Uus (317)			532 Uuo (317)			533 Uut (317)			534 Uuq (317)			535 Uup (317)			536 Uuh (317)			537 Uus (317)			538 Uuo (317)			539 Uut (317)			540 Uuq (317)			541 Uup (317)			542 Uuh (317)			543 Uus (317)			544 Uuo (317)			545 Uut (317)			546 Uuq (317)			547 Uup (317)			548 Uuh (317)			549 Uus (317)			550 Uuo (317)			551 Uut (317)			552 Uuq (317)			553 Uup (317)			554 Uuh (317)			555 Uus (317)			556 Uuo (317)			557 Uut (317)			558 Uuq (317)			559 Uup (317)			560 Uuh (317)			561 Uus (317)			562 Uuo (317)			563 Uut (317)			564 Uuq (317)			565 Uup (317)			566 Uuh (317)			567 Uus (317)			568 Uuo (317)			569 Uut (317)			570 Uuq (317)			571 Uup (317)			572 Uuh (317)			573 Uus (317)			574 Uuo (317)			575 Uut (317)			576 Uuq		