

Name Key Print Name NA = not attempt

BA = bad attempt

Please show work on all questions for partial credit even on questions which do not specify. (25 total pts)

$PV = nRT$, $R = 0.08206 \text{ (L atm) / (mol K)}$ $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$
 $760 \text{ mm Hg} = 1 \text{ atm.}$, $^{\circ}\text{C} + 273.15 = \text{Kelvin}$ $M = \text{moles / liter}$

note
 NW = no work

1. Circle the following which are strong acids. (3 pts)

HCl

HF

CH₃COOH

HBr

HNO₃

H₂SO₄

$\frac{1}{2}$ pt each

2. Calculate the oxidation state of the circled element in the following molecule. (4 pts)

HNO₃ H +1, O -2 — edges of periodic table no-odd
 Change solve for N → $N = 6 - 1 = +5$
 $(+1) + N + 3(-2) = \text{zero}$ BA -2 said -1 +5 go #

3. Calculate the concentration made up by using 4.5 grams of Na Cl (FW of Na Cl = 58.5 g/mole) dissolved to make up 1.2 Liters of solution. (6 pts)

$\# \text{ moles} = \frac{4.5 \text{ g}}{58.5 \text{ g}} = 0.07692 \text{ moles}$ $M = \# \text{ moles / liter}$ 2 1/2 pt

$M = \frac{0.07692 \text{ moles}}{1.2 \text{ L}} = 0.064 \text{ (2 s.f.)}$
 -1 2 pt math - 1/2 BA 3

4. If we are doing a titration by combining HCl with KOH using 0.25 M of the HCl with 0.15 M of the KOH starting with 0.250 Liter of the HCl, how many liters of KOH will you need? (6 pts)

BA-3



$0.250 \text{ L HCl soln} \times \frac{0.25 \text{ moles HCl}}{1 \text{ L HCl soln}} \times \frac{1 \text{ mol KOH}}{1 \text{ mol HCl}} \times \frac{1 \text{ L KOH}}{0.15 \text{ mol KOH}}$
 2 pt 1 pt 1 pt 1 pt
 $= 0.417 \text{ L KOH}$ 1 pt math - 1/2 pt

5. If you have n (principal quantum number) = 5, what are the possible values of angular momentum quantum number (l) (3 pts)

$$l = 0, 1, 2, 3, 4$$
$$n = 5, l = 0, \dots, (n-1)$$
$$n-1 = 5-1 = 4$$

9arr p.2

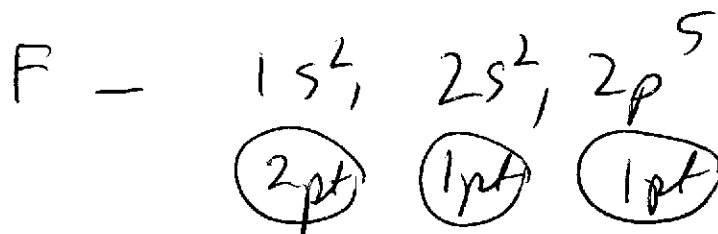
$$l = 0, 1, 2, 3, 4$$

$$BA = -1\frac{1}{2}$$

$$\text{gave only } 4 \quad -1\frac{1}{2}$$

Extra Credit Question: (4 pts)

What is the electron configuration for the element fluorine (F)? Show electron configuration in the format $1s^2, 2s^2, 2p^6$.



$$(2pt)$$

$$(1pt)$$

$$(1pt)$$

$$BA = 2$$

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$PV = nRT$, $R = 0.08206 \text{ (L atm) / (mol K)}$ $(P_2 V_2) / (P_1 V_1) = T_2 / T_1$ note
 760 mm Hg = 1 atm., $^{\circ}\text{C} + 273.15 = \text{Kelvin}$ $M = \text{moles / liter}$

1. Circle the following which are weak acids. (3 pts)

HCl HF CH₃COOH HBr HNO₃ H₂SO₄ 2 pt each

2. Calculate the oxidation state of the circled element in the following molecule. (4 pts)

H +1 (group 1), O -2 (group 6 - 8 = -2) solve for P
 H_3PO_4 $3(+1) + P + 4(-2) = \text{zero}$ BA - 2 math - 2 pt
 $3 + P - 8 = 0$
 $P = +8 - 3 = +5$ said +5 got -1

3. Calculate the concentration made up by using 7.2 grams of NaCl (FW of NaCl = 58.5 g/mole) dissolved to make up 2.3 Liters of solution. (6 pts)

$m = \# \text{ moles / liter soln.}$ BA - 3
moles = 7.2 g NaCl / 58.5g = 0.1230 moles 2 1/2 pt
 $m = \frac{0.1230 \text{ moles NaCl}}{2.3 \text{ l}} = 0.054 \text{ M}$ 2 1/2 pt

4. You have a gas at 780.2 mm Hg at 27.8 °C in a 1.2 liter container. You compress the gas to a volume of 0.789 Liter and measure the temperature to 30° C. What is the new pressure of the gas? (6 pts)

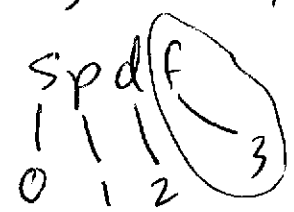
$P_1 = 780.2 \text{ mm Hg} / 760 = 1.03 \text{ atm}$ $P_2 = ?$ 1/2 pt each this is 3/4 pt
 $T_1 = 27.8^{\circ}\text{C} + 273.15$ $T_2 = 30^{\circ}\text{C} + 273.15 = 303.15$
 $V_1 = 1.2 \text{ l}$ $V_2 = 0.789 \text{ l}$ 300.95K plug in 3 pt

$\frac{P_2 V_2}{P_1 V_1} = \frac{T_2}{T_1} \rightarrow \frac{P_2 (0.789 \text{ l})}{(1.03 \text{ atm})(1.2 \text{ l})} = \frac{303.15 \text{ K}}{300.95 \text{ K}}$
math - 1/2 pt $P_2 = \frac{(303.15 \text{ K})(1.03 \text{ atm})(1.2 \text{ l})}{(300.95 \text{ K})(0.789 \text{ l})} = 1.6 \text{ atm}$

5. If you have an angular momentum quantum number (l) of 3, what are the possible values of the magnetic quantum number (m_l)? (3 pts)

10 p. 2

$l = 3, m_l = -l, \dots, 0, \dots, +l$
 $m_l = -3, -2, -1, 0, +1, +2, +3$

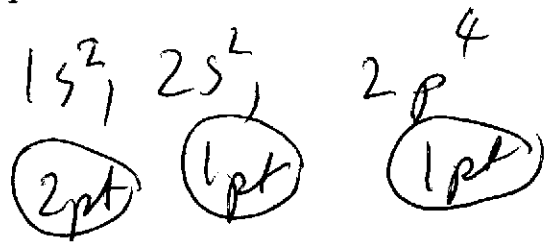


BA - 1/2

Gave only one # -1

Extra Credit Question: (4 pts)

What is the electron configuration for the element oxygen (O)? Show electron configuration in the format $1s^2, 2s^2, 2p^6$.



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5. If you have n (principal quantum number) = 5, what are the possible values of angular momentum quantum number (l) (3 pts)

l

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5. If you have an angular momentum quantum number (m_l) of 3, what are the possible values of the magnetic quantum number (m_s)? (3 pts)

m_l

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