WORKSHEET #1

Name: **Date:**   **Period:**   **Seat #:**

Show all work

[1] For each system below, indicate whether ΔS and ΔH is a positive or negative value. Then indicate if the reaction is entropy driven, enthalpy driven, or neither. Will the reaction be spontaneous at high temperatures, low temperatures, always or never? Qualitative, explain to your table group.

[a] NaCl (s) + H₂O (l) + heat → NaCl (aq)		
ΔS =	ΔH =	Driven?
[b] O₂ (g) + H₂O (l) → O₂ (aq) + heat		
ΔS =	ΔH =	Driven?
[c] CO₂ (s) + heat → CO₂ (g)		
ΔS =	ΔH =	Driven?

[2] Calculate the ΔH_{rxn}, ΔS_{rxn}, $\Delta S_{universe}$, ΔG_{rxn}. For each system below, indicate whether ΔS and ΔH is a positive or negative value. Then indicate of the reaction is entropy driven, enthalpy driven, or neither. Quantitative

Substance	$\Delta H°_{formation}$ (kJ/mole)	$\Delta S°_{formation}$ (J/mole°K)	$\Delta G°_{formation}$ (kJ/mole)
C₃H₈ (l)	-103.8	269.9	-23.5
O₂ (g)	0	205.1	0
CO₂ (g)	-393.5	213.7	394.4
H₂O (g)	-241.8	188.8	-228.6
TiO₂ (s)	-939.7	49.9	-884.5
TiCl₄ (l)	-804.2	252.3	-737.2
C (s)	0	5.7	0
Cl₂ (g)	0	223.1	0

* must solve for temperature first

$\Delta H° = \Sigma \Delta H_f°\ products$ $- \Sigma \Delta H_f°\ reactants$	$\Delta S° = \Sigma \Delta S°\ products$ $- \Sigma \Delta S°\ reactants$	$\Delta S_{universe} = \dfrac{-\Delta H}{T}$	$\Delta G° = \Delta H° - \Delta S°$

A) C₃H₈ (l) + 5 O₂ (g) → 3CO₂ (g) + 4H₂O (g)

B) TiO₂ (s) + C (s) + 2Cl₂ (g) → TiCl₄ (l) + CO (g)