

Name: \_\_\_\_\_

Period: \_\_\_\_\_

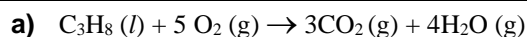
Seat#: \_\_\_\_\_

- 1) For each system below, indicate whether  $\Delta S$  and  $\Delta H$  is a positive or negative value. Then indicate if the reaction is entropy driven, enthalpy driven, both or neither. Qualitative, you do not need to do calculations for this part.

<b>a)</b> $\text{NaCl}_{(s)} + \text{H}_2\text{O}_{(l)} + \text{heat} \rightarrow \text{NaCl}_{(aq)}$	<b>b)</b> $\text{O}_2_{(g)} + \text{H}_2\text{O}_{(l)} \rightarrow \text{O}_2_{(aq)} + \text{heat}$	<b>c)</b> $\text{CO}_2_{(s)} + \text{heat} \rightarrow \text{CO}_2_{(g)}$
$\Delta S =$	$\Delta S =$	$\Delta S =$
$\Delta H =$	$\Delta H =$	$\Delta H =$
Driven?	Driven?	Driven?

- 2) Calculate  $\Delta H^\circ_{\text{rxn}}$ ,  $\Delta S^\circ_{\text{rxn}}$ ,  $\Delta G^\circ_{\text{rxn}}$ . Then, indicate whether  $\Delta H^\circ$ ,  $\Delta S^\circ$ ,  $\Delta G^\circ$  are positive or negative values. Then indicate if the reaction is spontaneous or not. Then indicate if the reaction is entropy driven, enthalpy driven, both, or neither.

$\Delta H^\circ = \Sigma \Delta H^\circ_f \text{ prod.} - \Sigma \Delta H^\circ_f \text{ react.}$	$\Delta S^\circ = \Sigma S^\circ \text{ prod.} - \Sigma S^\circ \text{ react.}$	$\Delta G^\circ = \Sigma \Delta G^\circ \text{ prod.} - \Sigma \Delta G^\circ \text{ react.}$	
Substance	$\Delta H^\circ_{\text{formation}} \text{ (kJ/mole)}$	$S^\circ_{\text{formation}} \text{ (J/mole}\cdot\text{K)}$	$\Delta G^\circ_{\text{formation}} \text{ (kJ/mole)}$
$\text{C}_3\text{H}_8 \text{ (l)}$	-103.8	269.9	-23.5
$\text{O}_2 \text{ (g)}$	0	205.1	0
$\text{CO}_2 \text{ (g)}$	-393.5	213.7	-394.4
$\text{H}_2\text{O} \text{ (g)}$	-241.8	188.8	-228.6
$\text{TiO}_2 \text{ (s)}$	-939.7	49.9	-884.5
$\text{TiCl}_4 \text{ (l)}$	-804.2	252.3	-737.2
$\text{C} \text{ (s)}$	0	5.7	0
$\text{Cl}_2 \text{ (g)}$	0	223.1	0



After calculations circle/highlight:

$\Delta H^\circ$     +    or    -

$\Delta S^\circ$     +    or    -

$\Delta G^\circ$     +    or    -

Spontaneous /

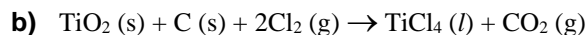
"thermodynamically favorable":

Yes    No

Driven:

Enthalpy    Entropy

Both        Neither



After calculations circle/highlight:

$\Delta H^\circ$     +    or    -

$\Delta S^\circ$     +    or    -

$\Delta G^\circ$     +    or    -

Spontaneous /

"thermodynamically favorable":

Yes    No

Driven:

Enthalpy    Entropy

Both        Neither