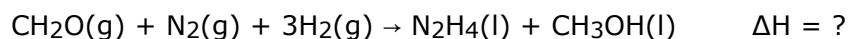
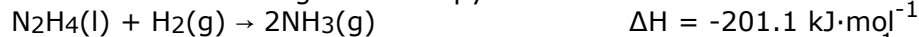


1. Assuming the apparatus itself absorbs no heat, what will be the final temperature of a bomb calorimeter's heat sink consisting of 100 mL of water at 15 °C if the reaction releases 6.276 kJ of heat?

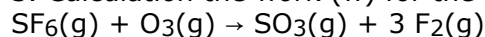
1. 30 K
2. 303 °C
3. 30 °C
4. 0 °C
5. -303 °C
6. 273 K

2. Calculate the change in enthalpy for the reaction below based on the provided data.



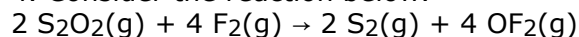
1.  $\Delta\text{H} = -28.4 \text{ kJ}\cdot\text{mol}^{-1}$
2.  $\Delta\text{H} = -207.7 \text{ kJ}\cdot\text{mol}^{-1}$
3.  $\Delta\text{H} = 194.5 \text{ kJ}\cdot\text{mol}^{-1}$
4.  $\Delta\text{H} = -378.1 \text{ kJ}\cdot\text{mol}^{-1}$
5.  $\Delta\text{H} = 24.1 \text{ kJ}\cdot\text{mol}^{-1}$

3. Calculate the work (w) for the following reaction conducted at 1000 °C:



1. 21.2 kJ
2. -21.2 kJ
3. 16.6 kJ
4. -16.6 kJ

4. Consider the reaction below.



Its change in entropy would likely be (positive/negative/either) and (large/small)

1. either, small
2. negative, small
3. positive, small
4. either, large
5. negative, large
6. positive, large

5. Which of the following reactions would be spontaneous at some temperatures and non-spontaneous at other temperatures?

rxn	$\Delta S_{\text{rxn}}(\text{J}\cdot\text{mol}^{-1}\cdot\text{K}^{-1})$	$\Delta H_{\text{rxn}}(\text{kJ}\cdot\text{mol}^{-1})$
I	-25.20	2.45
II	1.15	879.23
III	13.93	-367.10
IV	-4.76	-98.04

1. I and II
2. I and III
3. I and IV
4. II and III
5. II and IV

6. III and IV

6. What would be the total energy associated with the motion of a gaseous system composed of 1 mole each of  $\text{CO}_2$ ,  $\text{O}_2$  and  $\text{O}_3$ ?

1. 12 RT
2. 24 RT
3. 18RT
4. 9RT
5. 6RT
6. 15RT