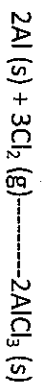
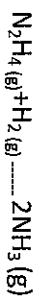


Using the data sheet calculate the delta S values for the following reactions. In each case explain the sign of Delta S.



DATA SHEET

Question 9

Substance	S° (J/mol-K)	S° (J/mol-K)
$N_2H_4(l)$	238.5	
$H_2(g)$	130.58	
$NH_3(g)$	192.5	
$Al(s)$	28.32	
$Cl_2(g)$	222.96	
$AlCl_3(s)$	109.3	
$Mg(OH)_2(s)$	63.24	
$HCl(g)$	186.69	
$MgCl_2(s)$	89.6	
$H_2O(l)$	69.91	
$CH_4(g)$	186.3	
$C_2H_6(g)$	229.5	
$H_2(g)$	130.58	

Question 10

Substance	ΔH_f° (kJ/mol)	S° (J/mol-K)	ΔG_f° (kJ/mol)
$Ni(s)$	0	29.9	0
$Cl_2(g)$	0	222.96	0
$NiCl_2(s)$	-305.3	97.65	-259.0
$CaCO_3(s, calcite)$	-1207.1	92.48	-1128.76
$CaO(s)$	-635.5	39.75	-604.17
$CO_2(g)$	-393.5	213.6	-394.4
$CH_3OH(l)$	-238.6	126.8	-166.23
$O_2(g)$	0	205.0	0
$H_2O(l)$	-285.83	69.91	-237.13