# Chemistry 12
SPONTANEOUS, NON-SPONTANEOUS OR EQUILIBRIUM?

In each of the following, decide
i)   which side is favoured by the tendency to minimum enthalpy; that is, which side of the reaction has the lower energy.
ii) which side is favoured by the tendency to maximum entropy; that is, which side of the reaction has the more random species.
iii) whether the reaction will be
   • a spontaneous reaction which goes to completion ("GOES 100%"), or
   • a non–spontaneous reaction in which NO products are formed ("WON'T OCCUR"), or
   • a spontaneous equilibrium reaction in which the tendency to minimum enthalpy will be balanced by an opposing tendency to maximum entropy ("EQUILIBRIUM").

Note: in parts (a) to (d) all the species are GASES

a)

b)

c)

d)
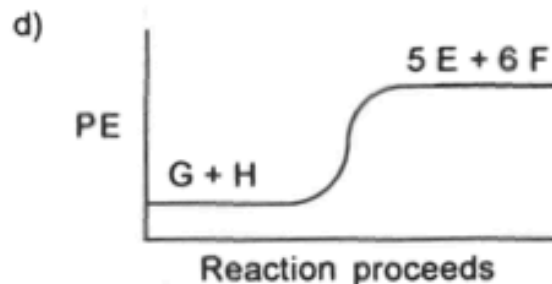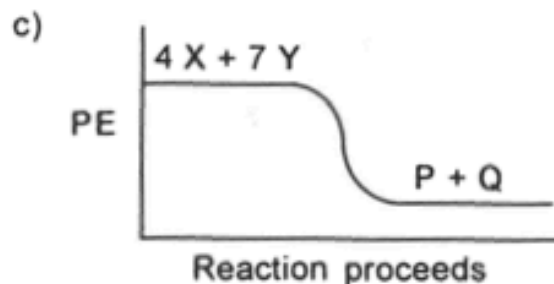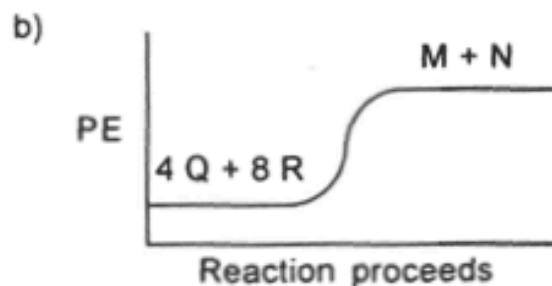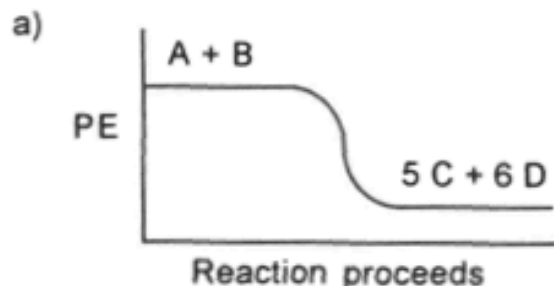
e) $H_2SO_4(l) + H_2O(l) \longrightarrow H_2SO_4(aq) + 150 \, kJ$

f) $C_2H_6(g) \longrightarrow C_2H_2(g) + 2 H_2(g)$; $\Delta H = 311 \, kJ$

g) $C_2H_2(g) + Ca(OH)_2(aq) \longrightarrow CaC_2(s) + 2 H_2O(l)$; $\Delta H = 183 \, kJ$

h) $2 C(s) + O_2(g) \longrightarrow 2 CO(g)$; $\Delta H = -221 \, kJ$