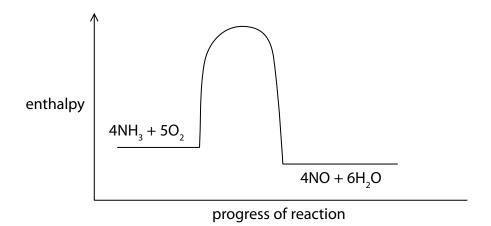
3	Am	nmonia is used in the manufacture of nitric acid.	
	The	e equation for one step in this manufacturing process is:	
		$4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$ $\Delta_r H = -900 \text{ kJ mol}^{-1}$	
	*(a)	A manufacturer carries out this reaction at a temperature of 1200 K and a pressure of 10 atm. A scientist proposes that a temperature of 1000 K should be used at the same pressure.	
		Evaluate the effects of making this change on the rate and yield of this reaction.	(6)

(b) When this reaction is used in industry, the catalyst is an alloy of platinum and rhodium.

The diagram shows the reaction profile for the uncatalysed reaction.



(i) On the diagram, draw the reaction profile for the catalysed reaction.

(1)

- (ii) Label the diagram to show
 - the enthalpy change, $\Delta_r H$
 - the activation energy, E_a

for the catalysed reaction.

(2)

(c) Write the expression for the equilibrium constant, K_c , for this reaction.

(1)

(Total for Question 3 = 10 marks)