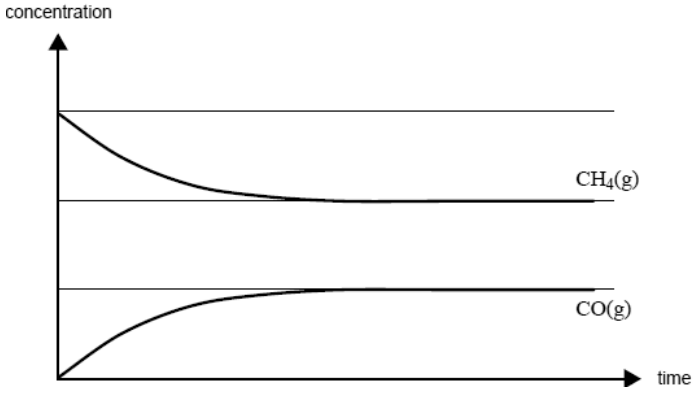
Friday Worksheet **Name: …….**

Rates of reaction worksheet 2

1) Carbon monoxide and hydrogen can be produced from the reaction of methane with steam according to the equation below.

$$CH_4(g) + H_2O(g) <=> CO(g) + 3H_2(g); \Delta H = +206 \text{ kJ mol}^{-1}$$

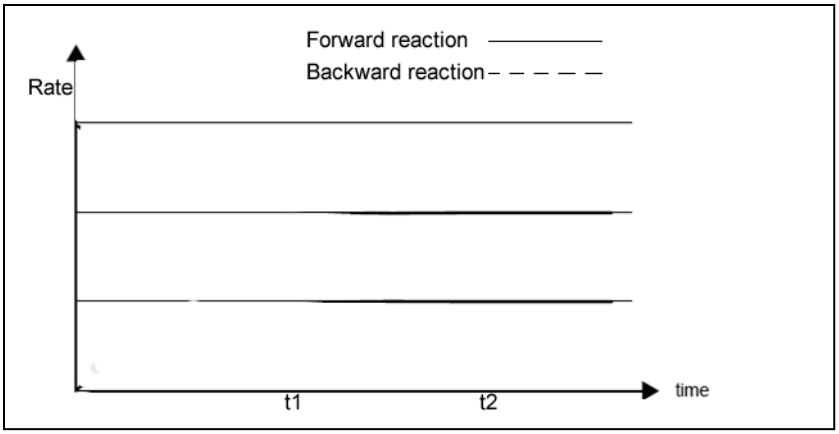
Some methane and steam are placed in a closed container and allowed to react at a fixed temperature. The following graph shows the change in concentration of methane and carbon monoxide as the reaction progresses.



a) On the graph above, draw a line to show the change in concentration of hydrogen gas as the reaction progresses. Label this line.

b) On the graph above, draw a line to show how the formation of carbon monoxide would differ over time in the presence of a catalyst. Label this line.

c) Draw the rate vs time graph for the forward and backward reactions on the set of axis below.



2) Explain why the following statements are True or False.

a) According to the Collision Theory all collision between reactant particles lead to a reaction.

b) All particles at 40 ^{O}C have more kinetic energy than the same particles at 20 ^{o}C.

c) A catalyst increases the rate and the yield of chemical reactions.

d) The rate of the forward reaction, at constant temperature, increases as the reaction proceeds.

e) Endothermic reactions are slower than exothermic reactions.

f) An increase in temperature increases the activation energy needed for reactant particles to react.

g) Increasing the activation energy increases the fraction of particles with the necessary activation energy with which to react.