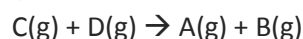


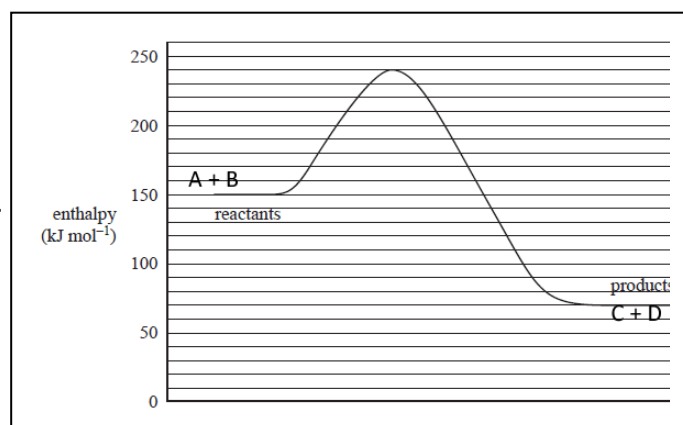
Ongoing Revision 7 – enthalpy, galvanic, redox reaction, isomers and atom economy.

- 1) The energy profile of the reaction
 $A(g) + B(g) \rightarrow C(g) + D(g)$ is shown on the right.

a) What is the ΔH for the reaction below?



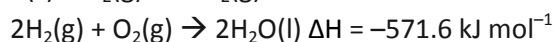
b) What is the activation energy for the reaction $C(g) + D(g) \rightarrow A(g) + B(g)$?



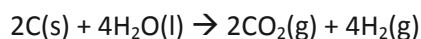
c) Draw on the energy profile above what changes take place when a catalyst is added.

d) Explain how a catalyst changes the forward and backward rates of reaction.

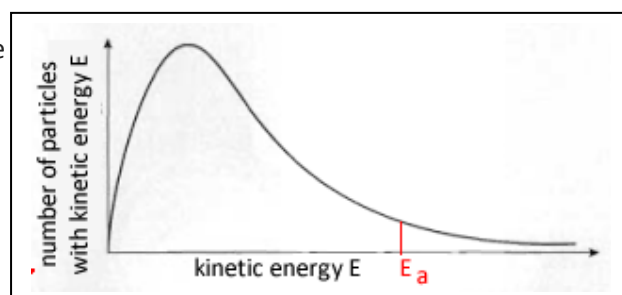
- 2) Consider the following thermochemical equations.



a) Calculate the ΔH for the reaction below



b) At a given temperature the distribution of the kinetic energy of reactant particles of the reaction $A(g) + B(g) \rightarrow C(g) + D(g)$ is shown on the right. E_a is the activation energy for this reaction.



i. At this temperature the number of successful collisions between reactant particles is very low. With the exception of increasing concentration and increasing surface area of reactant particles, discuss two other ways in which the rate of the reaction can be increased.

ii. Draw on the energy distribution curve, shown above, how each method mentioned in i. changes the curve and how this impacts on the rate of the reaction.

- 3) Write the balanced chemical equation for the combustion of liquid propane and justify why this is or is not a redox reaction.

4) Consider the following cells.

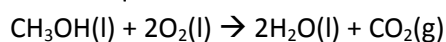
Fuel cell, primary galvanic cell, secondary galvanic cell, electrolytic cell.

a) Which one of the classes of electrochemical cells, above, involves **only** a non-spontaneous redox reaction?

b) What is the difference between a secondary and primary cell?

c) A student was heard to say "A fuel cell is a galvanic cell that can be recharged continuously" Is this comment true or false? Justify your answer.

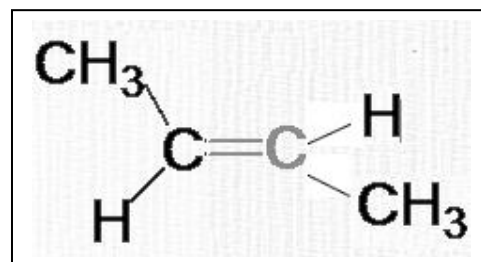
d) Methanol is suitable for use in a micro fuel cell that is used to power laptop computers and similar small electrical items. The methanol is oxidised to carbon dioxide and water. The overall equation for the reaction is



Write the balanced half equation for the

- anode reaction
- cathode reaction

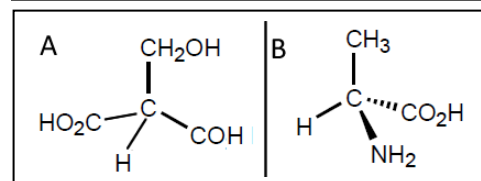
5) Name the molecule shown on the right.



6) Consider the two molecules shown on the right.

a) Which of the molecules shown are chiral?

b) How many optical isomers are possible for each?



c) i. Draw the structural formula for 2-hydroxybutanoic acid.

ii. Is it a chiral molecule and if so how many optical isomers are possible?

d) i. Write a balanced chemical equation for the formation of pentyl butanoate from pentanol and butanoic acid. (States not required)

ii. Calculate the percentage atom economy for this reaction.

iii. Calculate the percentage yield of the reaction if 1.76 grams of butanoic acid was placed in excess pentanol to produce 2.56 grams of pentyl butanoate.