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ASSIGNMENT

1. Activation energy is the minimum amount of energy required to activate atoms or molecules in order to undergo a specified reaction.

2a. K = AeEa/RT

K is the rate contestant

A is pre – exponential or Arrhenius factor.

EA is the activation energy

R is the gas constant

T is the temperature in Kelvin

2b.(i) The exponential term in the Arrhenius equation implies that the rate constant of a reaction, decreases exponentially when the activation energy increases. Due to the fact that the rate of reaction is directly proportional to the rate constant, the rate decreases exponentially as well. Since a reaction with high activation energy requires a lot of energy requires a lot of energy to reach the transition state, it proceeds slower than a reaction with a lower activation energy.

2b.(ii) The Arrhenius equation can be used to determine the effect of a change in temperature on the rate constant, and consequently on the rate of the reaction. For a temperature change of 20oC to 30oC, the frequency factor is approximately constant but, the quantity e-Ea/eT, the fraction of molecules with energy is equal to more than excess of the activation energy. With an activation energy of 50kJ/mol, at 20oC, the value of the fraction is 1.21 x 10-9 raising the temperature makes the fraction 2.38 x 10-9. The fraction of the molecule able to react has almost doubled by increasing the temperature by 10oC, the rate of reaction is nearly doubled.

3.

