LECTURE 33

1. The Arrhenius factor A (pre-exponential factor) for the isomerization reaction of $CH_3NC \rightleftharpoons CH_3CN$ is 14.3×10^{13} s^{-1}, and the reaction rate constant is 0.41 s^{-1} at 600.0 K.
   (a) Calculate the Activation Energy for this reaction in kJ/mol.
   (b) Calculate the temperature to one significant figure that is required for the rate constant to be 1×10^5 s^{-1}.

2. Cyclopropane isomerizes to propylene according to a first-order reaction:
   cyclopropane → propylene
   The activation energy is 272 kJ mol^{-1}.
   At 500.0°C, the reaction rate constant is 6.1×10^{-4} s^{-1}.
   (a) Calculate the Arrhenius factor A (pre-exponential factor) for this reaction.
   (b) Calculate the rate constant for this reaction at 25.0°C.

3. For the reactions:
   Reaction (1) A → B + C
   Reaction (2) D → F + G
   For reaction (1), the activation energy for the forward reaction ($E_{a,f}$) is 371 kJ mol^{-1} and the activation energy for the reverse reaction ($E_{a,r}$) is 139 kJ mol^{-1}. Based on this information, predict whether the reaction is endothermic or exothermic.

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