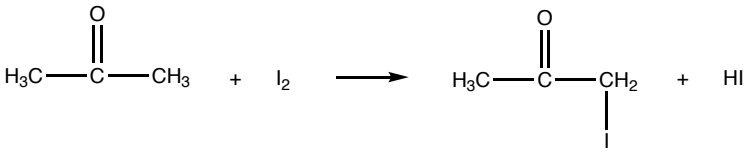
RATES OF REACTION (D)

Propanone reacts with iodine in the presence of an acid catalyst.



The rate equation for this reaction is:

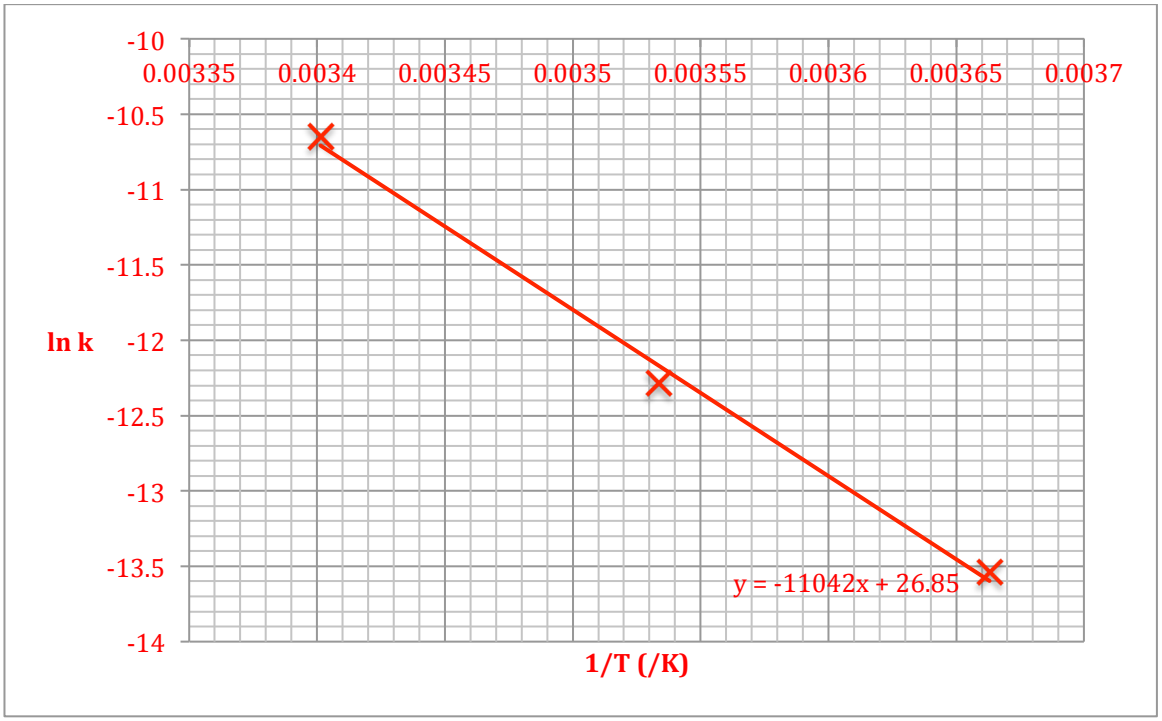
rate = k [CH_3COCH_3] [H^+]

a How can you tell that the H^+ ions act as a catalyst in this reaction?

H^+ is in rate equation but the stoichiometric equation

b The table shows how the rate constant varies with temperature. Complete the table and use the data to find the activation energy for the reaction.

T (K)	k (mol^{-1} dm^3 s^{-1})	1/T (K^{-1})	ln k
273	1.32×10^{-6}	**0.003663**	**–13.54**
283	4.62×10^{-6}	**0.003534**	**–12.29**
294	2.37×10^{-5}	**0.003401**	**–10.65**



gradient = $\frac{-E_a}{R}$ = –11042

E_a = 8.31 x 11042 = 91800 J mol^{-1} = 91.8 kJ mol^{-1}