

## Biophysical Chemistry

### Week 8 Problems

To be handed in by Thursday 12<sup>th</sup> May 2016, 17:00 (no lecture 16<sup>th</sup> May)  
(either at my office 01/05 under the door or at the secretary's office 3<sup>rd</sup> floor or  
in exceptional circumstances as a single pdf file via e-mail)

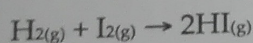
1. A reaction was monitored by determining the intensity of the yellow colour of the products using a spectrophotometer.

time (sec)	0	300	780	1500	2400	3600	$\infty$
Abs	0	0.036	0.074	0.120	0.162	0.199	0.249

Find the order, the rate constant and the half-life of the reaction.

Hint: deduct absorbance values at the various time points from the value at infinity in order to measure the reduction in concentration of the reactant.

2. The rate constant  $k$  of the (overall) second order reaction



varies with temperature as follows:

T (K)	556	700	781
$k$ ( $\text{mol}^{-1}\text{dm}^3\text{s}^{-1}$ )	$1.19 \times 10^{-4}$	$1.72 \times 10^{-1}$	3.58

Calculate

- (a) the activation energy of the reaction
- (b) the rate constant at 629 K
- (c) the rate constant for the reverse reaction at 629 K given that the equilibrium constant is 3.73 at this temperature (hint  $k_1/k_{-1} = K$ ).