91165: Demonstrate understanding of the properties of selected organic compounds

About the standard

- This standard is broken in to a few key parts
    - Rates of reaction
    - Equilibrium
    - Acids and Bases

There may be explicit questions on each of these areas, but expect naming and reactions to pop up throughout the paper

Strategies for success

How changing conditions affects the rate of a reaction:

If you can discuss how changing concentrations, adding a catalyst, changing surface area and changing temperature will affect the rate of a given reaction then you are good to go! When reading a question a good question to ask yourself is “what are they changing?” If you can pick that then you are generally well on the way to getting the question right.

One crucial one is about the influence of temperature because there are two points you need to discuss.

- When you increase temperature the particles will start moving around fast so they will bump into each other more and so the reaction rate will increase.
- BUT we can’t forget that increasing the temperature also means that the particles are more likely to have the energy required to react (otherwise known as the activation energy). So that when a collision does happen since its is more likely that

the particles will have the required activation energy, there will be more successful collisions per second which will increase the rate.

Remember to always relate it back to collision theory including, statements like “number of successful collisions per second” is a good way to go.

How to calculate things other than pH:

Most students are comfortable with calculating pH when given the concentration of H_3O^+ but where they trip up is being asked to calculate things other than pH such as the concentration of OH^- ions or pOH, or having to calculate pH when given the concentration of a strong base. What is important to realise is that you can convert through all of these with no additional information.

For example a 0.1 $moll^{-1}$ solution of NaOH will have an OH^- concentration of 0.1 since NaOH is a strong base. However this won’t allow us to calculate the pH directly. From here we have two options.

- We can take the negative log of OH^- concentration which will give us the pOH which in this case is 1. We can then use pH + pOH = 14, rearrange this get pH = 14-1 =13

- We could also use $Kw = [H_3O^+][OH^-] = 10^{-14}$. Rearrange to get $10^{-14}/0.1 = [H_3O^+] = 10^{-13}$. Then we can take the negative log of this number to get us to 13.

Both work and are equally valid, just pick the one you like the most and stick with it. The most important thing is that we didn’t actually need any other numbers from the question to make these conversions so don’t be scared of them and also make sure you read the question and give them what they are asking for!

How changing conditions affects an equilibrium system:

Much like reaction rates, if you are on board with how changing concentrations, changing pressure, changing temperature and adding a catalyst affect the position of an equilibrium then this section should go pretty well.

It all comes back to Le Chatelier's principle! “Whenever a change is made to a system the system will respond by trying to reduce the change”. So if we increase the concentration of a reactant then the system is going to try and reduce the concentration of that reactant again.

Remember, the only thing an equilibrium system can do to change things is by favouring either the forwards reaction or the reverse reaction. In the case of increase a reactant, the system is going to favour the forwards reaction to take away some of that reactant we just introduced.

They are particularly likely to ask about changing temperature, and, using a bit of information such as a colour change or a change in the value of Kc , you will probably be asked to determine whether a reaction is exothermic or endothermic. Again asking yourself “what is changing?” and “what will the system do in response to that change” Is a good way of kick-starting your answer.

Overall

- Everything comes down to naming and reactions, and they can appear all over the place in the exam and are not confined to single question like say polymers or identification
- We've covered some important strategies and things to remember, but we haven't covered everything.

- We really recommend going through the last 3-4 years of exam papers, and also using the StudyTime Walkthrough Guide and Checklist to really check and consolidate your knowledge and feel 100% prepared!