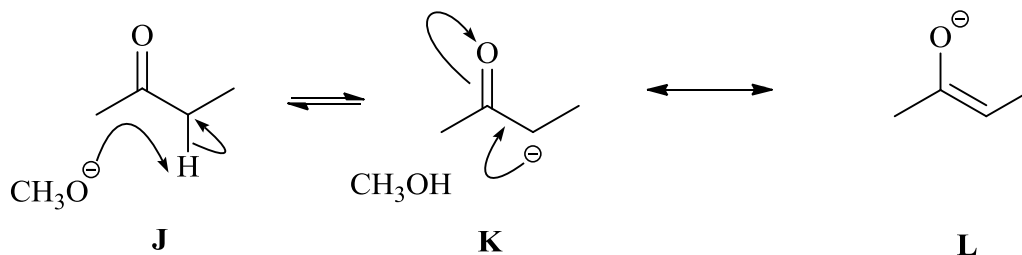


Marks
6

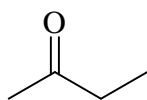
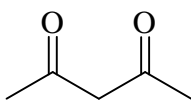
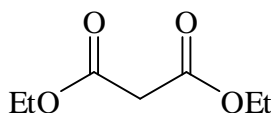
- Protons next to a carbonyl group can be removed by alkoxide bases as shown below.



Apply your understanding of resonance to propose a structure **L** that explains how the carbonyl group increases the acidity of these hydrogens.

Add curly arrows to the reaction scheme above to complete a mechanism for the deprotonation of **J** to give **K**, and the stabilisation of **K** by resonance.

The pK_a values of compounds **J**, **M** and **N** are 9, 13 and 19, but not in that order. Match each compound with the correct pK_a , and explain your answer.

**J****M****N**

pK_a values:

J = 19	M = 9	N = 13
---------------	--------------	---------------

Reasoning for above assignments

M and N are stronger acids than J as the charge on the carbanion can be delocalised onto 2 carbonyl groups rather than 1 (i.e. there are more resonance structures).

Enolate anions are stabilised by electron withdrawing groups which help reduce the negative charge on the carbon atom.

N is a weaker acid than M because the OEt group of the ester donates electron density towards the enolate anion, thus destabilising it.

Also the following resonance form of the ester would mean that the carbonyl group is less available to share the negative charge of the enolate anion.

