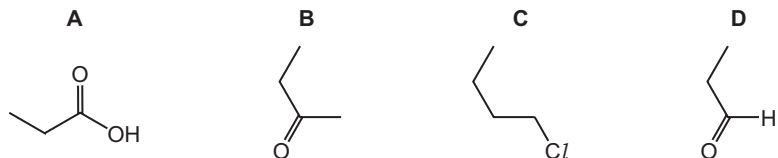


36 Compound Q reacts when heated with HCN in the presence of a catalyst to produce compound R.

Molecules of compound R each contain four carbon atoms.

What is compound Q?



38 Seven aldehydes and ketones

- contain only **one** oxygen atom per molecule
- have four or fewer carbon atoms in their structures.

Alkaline $I_2(aq)$ is added to each of these carbonyl compounds separately.

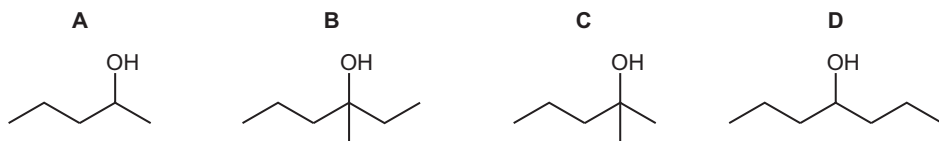
How many of these carbonyl compounds produce a yellow precipitate with alkaline $I_2(aq)$?

A 1 **B** 2 **C** 3 **D** 4

34 An organometallic lithium compound, RLi, contains the nucleophile R^- .

CH_3CH_2Li reacts with pentan-2-one. The mechanism is nucleophilic addition. The first step produces an anion which is then protonated to form the final product.

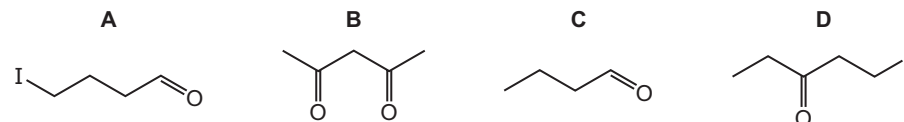
Which organic product is formed?



34 Three tests were performed on an unknown organic compound.

test reagent	test result
2,4-DNPH reagent	orange ppt
Tollens' reagent	no change
alkaline $I_2(aq)$	yellow ppt

What is the organic compound tested?



35 Butanone, $CH_3CH_2COCH_3$, and HCN mixed with a little KCN react together in a nucleophilic addition reaction.

Which description of the mechanism of this nucleophilic addition reaction is correct?

- A** The π bond pair of $C=O$ accepts H^+ from HCN and then CN^- acts as a nucleophile.
- B** A π bond pair from CN^- attacks the δ^+ C and HCN then donates H^+ to O.
- C** The lone pair on O accepts H^+ from HCN and then CN^- acts as a nucleophile.
- D** A lone pair from CN^- attacks the δ^+ C and then O^- accepts H^+ from HCN.