

1.  
3,4-difluoro pentan-2-one

2.  
(a)  $C_{12}H_{22}O_{11} + H_2O \rightarrow 2C_6H_{12}O_6$   
(b) (*any two of*) warm, anaerobic, yeast enzymes

3.  
(a) 2-methyl propan-1,2-diol  
(b) Orange to green. The primary hydroxyl group will be oxidised, reducing the dichromate to chromium.

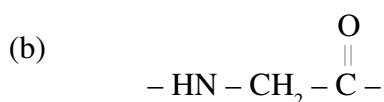
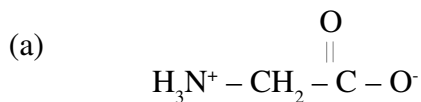
4.  
(a)  $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - H$   
(b) hexanoate ion (*or*)  $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - O^-$   
(c) A silver mirror forms. The Tollen's reagent is reduced to silver metal.  $Ag(NH_3)_2^+ + e^- \rightarrow Ag + 2NH_3$

5.  
(a)  $CH_3 - \overset{\overset{CH_3}{|}}{CH} - CH_2 - \overset{\overset{O}{||}}{C} - OH$  carboxylic acid  
(b)  $C_5H_{10}O_2 \rightleftharpoons C_5H_9O_2^- + H^+$   
(c) Effervescence (fizzing/bubbles)

6.  
(a)  $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - NH_2$   
(b) The nitrogen in the amine group has two unbonded electrons which allow it to accept a proton.  
(c) Primary.

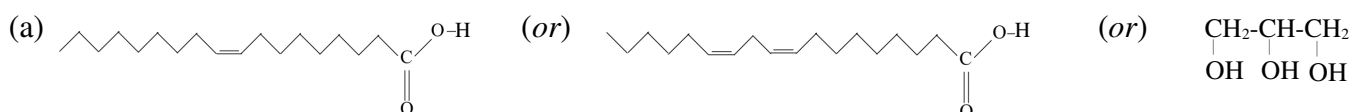
7.  
(a) methyl ethanoate  
(b) methanol and ethanoic acid (*or*)  $CH_3 - OH$  and  $CH_3 - \overset{\overset{O}{||}}{C} - OH$   
(c) (*any one of:*) reflux (heat),  $H^+$  ( $H_2SO_4$ ) catalyst  
(d) An example of an isomeric acid is propanoic acid. This has an OH bond which the ester doesn't, but has approximately the same molar mass. So they have similar strength dispersion forces but the hydrogen bonding present between molecules of propanoic acid cause it to have a higher b.pt.

8.



- (c) A small molecule (water) is eliminated (removed from larger molecules) during the reaction
- (d) The strong partial charges in the OH bonds of water are able to be attracted to the opposite partial charges in C=O and NH bonds in the protein chain.
- (e) A protein's function depends on its unique spatial arrangement. Increasing temperature or pH would disrupt secondary forces between sections of the chain, permanently changing its spatial arrangement.

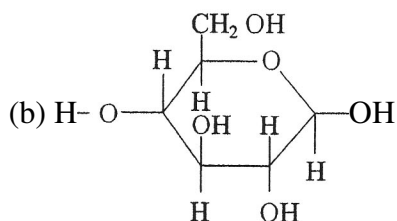
9.



- (b) Fish or plants
- (c) The orange/brown colour would disappear. The iodine undergoes an addition reaction with the alkene groups present.
- (d) Hydrogenation

10.

- (a) Polyhydroxy aldehydes and ketones



- (c) It does not contain an aldehyde group.