1. (a) Amino acids (b) Amide (c) O O O || | | | -N - CH - C - N - CH - C - | | | | | $H CH_2 H CH_2$ | | | | $CH_2 CH_2$ | | | $CH_2 CH_2$ | | |COOH COOH

(d) Valine has a non-polar side chain, glutamic acid has a polar side chain. The change affects secondary bonding and therefore the 3D shape will change.



(ii) Carboxyl group (acid) donates proton, amino group accepts proton (base).

(f) Covalent

2.

(a) Compound B, as it contains unsaturated C=C bonds and therefore its molecules are unable to fit as closely together.

(b) Land animals

2.

(a)
$$CH_3(CH_2)_7CHCH(CH_2)_7C_0^{OH}$$
 or $CH_3(CH_2)_4CHCHCH_2CHCH(CH_2)_7C_0^{OH}$

(b) It would.

(c) High pressure, high temperature, nickel catalyst (hydrogen gas is a reactant not a condition)

(d) Melting point increases

4.

(a) It is a polyhydroxy ketone

(b) Nothing would happen to the fructose mixture but the glucose mixture would form a silver mirror.

 $Ag(NH_3)_2^+ + e^- \longrightarrow Ag + 2NH_3$ or $C_6H_{12}O_6 + H_2O \rightarrow C_6H_{12}O_7 + 2H^+ + 2e^-$

or
$$C_6H_{12}O_6 + H_2O \rightarrow C_6H_{11}O_7 + 3H^+ + 2e^-$$

(c) Both contain large numbers of the polar hydroxyl group, allowing them to form hydrogen bonds with water molecules and become surrounded by them.