AS Level Biology A

H020/01 Breadth in Biology

Question Set 12

1. Fig. 22 shows a triglyceride molecule found in sunflower oil.

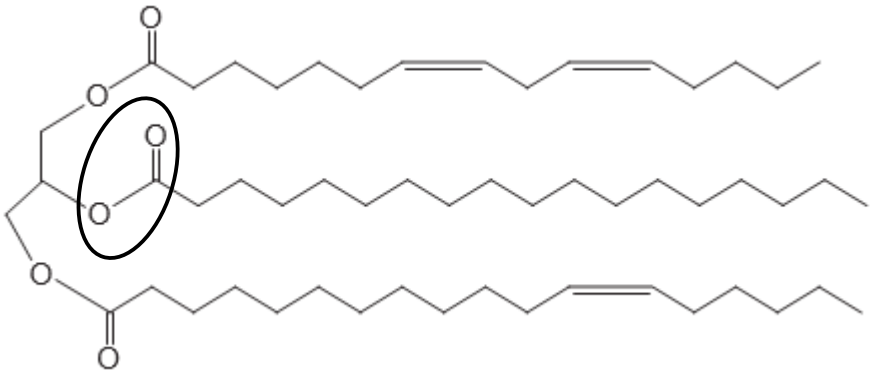

Fig. 22

(a) On Fig. 22 circle an ester bond.

[Answer on Fig. 22]

[1]

(b) Sunflower oil is used to make biodiesel, which contains methyl esters. The fatty acids in thetriglyceride molecule are reacted with methanol in a process called transesterification.

After the reaction, two liquid products form which naturally separate from each other. Themethyl esters float on top of a more dense liquid.

Name the part of the molecule seen in Fig. 22 that forms this more dense liquid.

.....Glycerol.....

[1]

(c) Living organisms have many uses for triglycerides, one of which is the production of phospholipids.

(i) Name three **other** functions of triglycerides in living organisms.

1 Thermal insulation.....

2 Buoyancy.....

3 Energy storage.....

[3]

(ii) Table 22 shows the melting points of some of the methyl esters made from the transesterification of sunflower oil fatty acids.

Methyl ester	Formula	Melting point (°C)
Methyl sterate	$C_{19}H_{38}O_2$	39.1
Methyl oleate	$C_{19}H_{36}O_2$	–19.9
Methyl linoleate	$C_{19}H_{34}O_2$	–35.0

Table 22

Describe and explain the pattern of the melting points of these three methyl esters.

[2]

Methyl esters with a lower number of hydrogen atoms posses more double bonds and have lower melting points. This is because the chains of less saturated molecules are more kinked, decreasing the number of potential interactions between molecules.

(d) Phospholipid molecules also contain fatty acids.

Explain how the fatty acids in phospholipids allow the formation of membranes. **[2]**

Two fatty acids form the hydrophobic tail of a phospholipid and join to the hydrophilic head via ester bonds Many phospholipids form a bilayer when in contact with water, with the hydrophobic fatty acid tails pointing inwards, away from water.

Total Marks for Question Set 12: 9