Mark schemes

Q1.

(a) 1. Circle(s)/shape(s) drawn around H in one of the HO groups of the glycerol **and** the OH group of the fatty acid;

Accept circle(s)/shape(s) drawn around the OH group of one molecule and the H of an OH group of the other molecule

2. Ester (bond);

3. Condensation (reaction);

3

(b) Stearic (acid);

1

(c) As (number of C) double bonds increases, melting point decreases

OR

As unsaturation increases, melting point decreases

OR

As saturation increases, melting point increases;

Accept converse

Accept C=C for double bonds

Accept as (number of) hydrogen/H (atoms) increases, melting point increases

1

(d) 1. More unsaturated fatty acids increases fluidity (in (cell-surface membrane);

2. (Making cell-surface) membrane more fluid/ flexible;

3. Easy to engulf;

Accept for 2 marks, more unsaturated fatty acids increases membrane fluidity

Accept endocytosis for engulf

Accept more/easier for phagosomes to form

3

[8]

Q2.

(a) 1. Everything other than the COOH inside drawn box;

1

(b) (Triglyceride)

1. 3 fatty acids rather than 2;

2. 3 ester bonds rather than 2;
Accept 'only 2 fatty acids'

3. No phosphate group;
1, 2 and 3 Accept converse

2 max

(c) 1. Phospholipid both hydrophobic and hydrophilic

OR

Phospholipid polar

OR

Phosphate group is charged;

2. Triglycerides only hydrophobic

OR

Fatty acid/triglyceride is non-polar;
Accept 'Triglycerides not hydrophilic'

3. Hydrophilic/phosphate group attracts water (to either side of bilayer);
Accept 'faces water' for 'attracts water'
Ignore 'fatty acids repel water'

3

(c) 1. Fatty acid A is saturated

OR

Fatty acid B is unsaturated;

2. (At 4 months) less fatty acid A **and** more fatty acid B

OR

Fish oil has more fatty acid B than fatty acid A;
1 and 2 Accept identification of A (as saturated) or B (as unsaturated) using numbers from the table

3. Increase in fluidity caused by increased unsaturated fatty acids

OR

Increase in fluidity caused by increased fatty acid B (from the fish oil);

4. Double bonds/unsaturated fatty acids cause bends/kinks in fatty acid tail

OR

(Membrane more fluid because) phospholipids further apart;

3 max

[9]

Q3.

(a) 1. Breaking of ester bonds;

2. By addition of water;

Accept 'using', 'with' for addition

2

(b) 1. Emulsify lipids/fats;

Allow descriptions

2. Increases surface area (of lipid/fat) for (increased) lipase activity;

3. Form micelles;

Ignore 'neutralise'/ 'increase the pH'

2 max

(c) 1. Mutation results in (a new) allele;

2. Those with the (new) allele able to digest milk/triglycerides;

3. Individuals with CEL/allele more likely to (survive and) reproduce;

Accept 'pass on allele/characteristic' for reproduce

4. Directional selection;

5. Increase in frequency of (this) allele in population;

Accept description of increasing frequency, eg 'more common', 'higher proportion' but ignore increase in number of allele

*Allow ECF for use of gene rather than allele after not awarding mark in the first instance but **max 3** overall.*

Accept 'mutation' for allele

4 max

[8]