



BIOLOGY MIND

Edexcel

A-Level

BIOLOGY

Biological Molecules

Lipids 1

Time allowed
48 minutes

MARK SCHEME



Score

/40

Percentage

%

Lipids

Question Number	Answer	Additional Guidance	Mark
1 (a) (i)	<p>Any two from:</p> <p>{ mineral(s) / named mineral } ;;</p> <p>{ vitamin(s) / named vitamin } ;;</p> <p>{ carbohydrate / named soluble carbohydrate};</p> <p>water ;</p> <p>antibodies ;</p>	<p>Allow two named minerals or vitamins allow salt, potassium, sodium, etc IGNORE nitrogen, NB minerals AND named mineral = 1 mark vitamins AND named vitamin = 1 mark</p> <p>NOT sugar, lactose, starch, fibre, glycogen</p> <p>IGNORE amino acids , fats, fatty acids, glycerol, cholesterol</p>	(2)

Question Number	Answer	Additional Guidance	Mark
1 (a) (ii)	<ol style="list-style-type: none"> 1. more protein AND more lipid ; 2. idea that protein is needed for making more tissue ; 3. idea that lipids are a source of energy ; 4. idea of greater energy imbalance (for seals) ; 5. idea that excess energy is needed for {weight gain / stored as fat / eq} ; 6. Credit manipulation of figures e.g. calculation of difference between human and seal milk ; 	<ol style="list-style-type: none"> 1. IGNORE simple quote of figures ACCEPT as separate comments 2. ACCEPT growth 6. e.g. 12.4%, 9.9 / 9.86x more protein, 32.7%, 9.6 / 9.61x more lipid IGNORE about 10x 	(4)



Lipids

Question Number	Answer	Additional Guidance	Mark
1 (b) (i)	it contains no double bonds (in the hydrocarbon chain) / eq ;	ACCEPT no carbon carbon double bonds, no kinked chains NOT carbon oxygen double bonds	(1)

Question Number	Answer	Additional Guidance	Mark									
1 (b) (ii)	<table border="1"> <thead> <tr> <th>Group</th> <th>Total concentration of saturated fatty acids / mg per g milk</th> <th>Total concentration of unsaturated fatty acids / mg per g milk</th> </tr> </thead> <tbody> <tr> <td>Vegan</td> <td>325</td> <td>657</td> </tr> <tr> <td>Control</td> <td>497</td> <td>466 ;</td> </tr> </tbody> </table>	Group	Total concentration of saturated fatty acids / mg per g milk	Total concentration of unsaturated fatty acids / mg per g milk	Vegan	325	657	Control	497	466 ;		(1)
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Vegan	325	657										
Control	497	466 ;										

Question Number	Answer	Additional Guidance	Mark
1 (b) (iii)	<ol style="list-style-type: none"> idea that animal products have a higher proportion of saturated fats than plant material ; credit correct manipulation of figures to illustrate differences in milk content ; 	<ol style="list-style-type: none"> ACCEPT converse / saturated come from {meat / dairy} / unsaturated from plants e.g. 172 mg per g milk more saturated in control, 191 mg per g milk more unsaturated from vegans ACCEPT ECF for figure use from 4bii 	(2)



Lipids

Question Number	Answer	Additional Guidance	Mark
2(a)	<ol style="list-style-type: none"> 1. glycerol drawn correctly with three OH groups ; 2. 3 fatty acids ; 3. fatty acid(s) have COOH included at the end ; 	<p>Mp1 and 3 ACCEPT OH / HO NOT double bond to OH</p> <p>2. ACCEPT 3x one fatty acid stated ACCEPT R or zig-zag chain for fatty acid chain</p>	(3)

Question Number	Answer	Additional Guidance	Mark
2(b)	<ol style="list-style-type: none"> 1. idea of energy imbalance ; 2. loss of weight / eq ; 3. reduced metabolic rate / eq ; 4. lack of protein / reduced insulation / eq ; 5. idea that they will need to eat more { carbohydrate / protein / eq } for energy balance ; 	<ol style="list-style-type: none"> 2. ACCEPT lower BMI 3. ACCEPT fatigue 4. ACCEPT muscle wastage, Malnourishment, reduced immune system 	(2)

Question Number	Answer	Additional Guidance	Mark
2(c) *QWC	<p>(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. idea that there is a change in the {DNA sequence / base sequence of a gene / eq } ; 2. change in amino acid / change in primary structure of { protein / enzyme } ; 3. reference to different R groups ; 4. leading to different { type / position / eq } bonding ; 5. idea of change in folding e.g. different 3D structure ; 6. idea of change in {shape / properties} of the active site ; 7. idea of {lipid / substrate / eq} does not fit in the enzyme's active site ; 	<p>QWC emphasis clarity of expression</p> <ol style="list-style-type: none"> 1. IGNORE mRNA 4. ACCEPT named bond e.g. hydrogen, ionic, disulphide NOT peptide 5. ACCEPT change to tertiary structure 7. ACCEPT no enzyme-substrate complex made 	(5)



Lipids

Question Number	Answer	Mark
3(a)(i)	<ol style="list-style-type: none">reference to {COOH/ carboxylic/ acid} grouping (at one end) ;(long hydro)carbon chain / eq ;18 carbons / 17 carbons in hydrocarbon chain / eq ;Correct reference to (poly) unsaturated ;3 carbon-carbon double bonds / 4 double bonds ;kinked structure / eq ;	max (2)

Question Number	Answer	Mark
3(a)(ii)	Any one from <ol style="list-style-type: none">omega 3 has {3 carbon-carbon double bonds / 4 double bonds} , omega 6 has {2 / 3 } / eq ;omega 3 has less hydrogens / eq ;omega 3 is {kinkier / shorter} / eq ;omega 3 less saturated / eq ;	max (1)

Question Number	Answer	Mark
3(a)(iii)	<ol style="list-style-type: none">indication that fatty acid forms a bond with the OH group of the glycerol molecule ;indication that water is formed ;ester bond correctly drawn ;	(3)



Lipids

Question Number	Answer	Mark
3(b)	<ol style="list-style-type: none">1. less grass less omega 3 / eq ;2. less grass more omega 6 / eq ;3. more grass reduces the omega 6 to omega 3 ratio / eq ;4. credit correct manipulation of figures ;	max (3)

Question Number	Answer	Mark
3(c)(i)	Any two from: <ol style="list-style-type: none">1) high {salt / sodium}2) high cholesterol3) high saturated fat / high trans-fat4) high calories5) high alcohol6) low fibre / low NSP7) low antioxidants / low vitamin C / low vitamin E ;	(1)

Question Number	Answer	Mark
3(c)(ii)	blood pressure falls too low / coughs / swelling of ankles / impotence / tiredness / constipation / headache / confusion / depression / excessively low heart rate / allergy / stroke / provoked type II diabetes / frequent urination / fainting / dizziness / vomiting / dry mouth / breathing difficulties / irregular heart rate / chest pain / hives / rash / dehydration / reduced circulation effects / low potassium / blurred vision / eq ;	(1)



Lipids

Question Number	Answer	Mark
4(a)(i)	1 glycerol molecule and 3 fatty acid molecules ;	(1)

Question Number	Answer	Mark
4(a)(ii)	ester bond ;	(1)

Question Number	Answer	Mark
4(a)(iii)	condensation ;	(1)

Question Number	Answer	Mark
4(a)(iv)	have double bonds between carbon atoms and between carbon and oxygen atoms ;	(1)

Question Number	Answer	Mark
4(a)(v)	more hydrogen atoms than unsaturated lipids ;	(1)



Lipids

Question Number	Answer	Mark
4(b)(i)	<ol style="list-style-type: none">1. phosphate and base joined to pentose sugar ;2. base correctly joined to sugar ;3. phosphate correctly joined to two pentose sugars ;	(3)

Question Number	Answer	Mark
4(b)(ii)	(DNA) polymerase /(DNA) ligase / (DNA) helicase ;	(1)

