



**EXAM PAPERS PRACTICE**

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

2002

**XVIII**

1583

Time allowed  
**62 Minutes**

**Score**

**/52**

**Percentage**

**%**

**Biology**

**AQA  
AS & A LEVEL**

**Mark Scheme**

**3.1 Biological molecules**



1 (a)

	✓	✓	✓
			✓

		✓	✓
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One mark for each correct column

Mark ticks only and ignore crosses

4

(b) 1. Two marks for box round two hydrogens and one of the oxygens from OH groups on carbons 1 and 4;

2. One mark from incorrect answer involving any two hydrogens and an oxygen from carbons 1 and 4;

*Do not award marks if all atoms concerned are on same carbon atom or are on carbon atoms other than 1 and 4 or where the answer does not have two hydrogen and one oxygen*

2

(c) (i) 1. Holds chains / cellulose molecules together / forms cross links between chains / cellulose molecules / forms microfibrils, providing strength / rigidity (to cellulose / cell wall);

2. Hydrogen bonds strong in large numbers;x

*Principles here are first mark for where hydrogen bonds are formed and second for a consequence of this.*

*Accept microfibrils*

2

(ii) Compact / occupies small space / tightly packed;

*Answer indicates depth required. Answers such as "good for storage", "easily stored" or "small" are insufficient.*

1

[9]

2 (a) Double bond(s);

(Bonds) between carbon;

$\overline{\text{C}}=\text{C}$  bond(s) = 2 marks

'No' C=C bond(s) disqualifies 1 mark only

Accept: does not contain maximum number of H for 1 mark

Neutral: contains C=O bonds

2

(b) Graph shows negative correlation / description given;

Correlation does not mean causation / prevention / shows lower risk not prevention;

May be due to another factor / example given;

Neutral: refs. to methodology e.g. sample size / line of best fit

Q: Do not allow 'casual' relationship

3

(c) (i) Glycosidic;

Accept: if phonetically correct

Reject: ester bond

1

(ii) Contains glycerol / three fatty acids / forms three ester bonds;

Neutral: contains less fatty acids

Answers must refer to a triglyceride

Ignore refs. to incorrect bond names

Neutral: olestra has eight fatty acids / R groups

Reject: contains three glycerols

1

(iii) 9;

1

[8]



- 3 (a) 1. Crush / grind;
2. With ethanol / alcohol;
3. Then add water / then add to water;  
*2. Water must be added after ethanol for third mark.*
4. Forms emulsion / goes white / cloudy;  
*4. Do not accept carry out emulsion test.* 3
- (b) (i) 4 / four; 1
- (ii) 1. Phosphate /  $\text{PO}_4$ ;  
*"It" refers to phospholipid.*
2. Instead of one of the fatty acids / and two fatty acids;  
*1. Accept minor errors in formula. Do not accept phosphorus / phosphorus group.* 2
- (iii) 1. Double bonds (present) / some / two carbons with only one hydrogen / (double bonds) between carbon atoms / not saturated with hydrogen;  
*Answer refers to unsaturated unless otherwise clearly indicated.*  
*May be shown in appropriate diagram.*
2. In (fatty acid) **C** / 3; 2

[8]

4

(a) **Two** suitable suggestions;

E.g.

1. (Are mammals so) likely to have same physiology / reactions as humans;
2. Small enough to keep in laboratory / produce enough milk to extract;
3. (Can use a) large number.

*Ignore references to ethical issues*

2 max

- (b)
1. Hydrolysis of lipids produces fatty acids;
  2. Which lower pH of mixture.

2

- (c)
1. (Bile-activated lipase / it) increases growth rate (of kittens);
  2. Results for formula with lipase not (significantly) different from breast milk / are (significantly) different from formula milk alone;
  3. Showing addition of (bile-activated) lipase is the likely cause (of increased growth);
  4. Lipase increases rate of digestion of lipids / absorption of fatty acids.

3 max

[7]

- 5 (a) 1. Dissolve in alcohol, then add water;  
2. White emulsion shows presence of lipid. 2
- (b) Glycerol. 1
- (c) Ester. 1
- (d) Y (no mark)  
Contains double bond between (adjacent) carbon atoms in hydrocarbon chain. 1
- (e) 1. Divide mass of each lipid by total mass of all lipids (in that type of cell);  
2. Multiply answer by 100. 2
- (f) Red blood cells free in blood / not supported by other cells so cholesterol helps to maintain shape;  
*Allow converse for cell from ileum – cell supported by others in endothelium so cholesterol has less effect on maintaining shape.* 1
- (g) 1. Cell unable to change shape;  
2. (Because) cell has a cell wall;  
3. (Wall is) rigid / made of peptidoglycan / murein. 2 max
- [10]



- 6 Fatty acids used to make phospholipids;  
Phospholipids in membranes;  
More phospholipids more membranes made;

2 max

Fatty acids respired to release energy;  
More triglycerides more energy released;  
Energy used for cell production / production of named cell component;  
*Do not allow credit for 'making' energy*

2 max

[4]



- 7 (a)
1. Fewer children / less likely that children with asthma eat fish;  
*Accept converse.*
  2. Fewer children / less likely that children with asthma eat oily fish;  
*MP1 and 2 – Allow use of numbers.*
  3. Little / only 2% / no difference in (children with or without asthma who eat) non-oily fish.  
*Do not accept arguments related to amount of fish eaten*

3

- (b)
1. (Shake with) ethanol / alcohol;  
*1. Accept named alcohol*
  2. Then add (to) water;  
*2. Order must be correct*
  3. White / milky / cloudy (layer indicates oil).  
*3. Ignore forms emulsion as in stem*  
*3. Ignore precipitate*

3

[6]