



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
21 Minutes

Score

/18

Percentage

%

CHEMISTRY

**AQA
AS & A LEVEL**

Topic Questions

3.3 Organic chemistry

1

Summarised directions for recording responses to multiple completion questions			
A (i), (ii) and (iii) only	B (i) and (iii) only	C (ii) and (iv) only	D (iv) alone

Isomers of the ester $\text{HCOOCH}_2\text{CH}_2\text{CH}_3$, include

- (i) ethyl ethanoate
- (ii) methyl propanoate
- (iii) butanoic acid
- (iv) butyl methanoate

(Total 1 mark)



2. CH_2O is the empirical formula of

- A methanol
- B methyl methanoate
- C ethane-1,2-diol
- D butanal

(Total 1 mark)

3. How many structural isomers, which are esters, have the molecular formula $\text{C}_4\text{H}_8\text{O}_2$?

- A 2
- B 3
- C 4
- D 5

(Total 1 mark)

4. Hydrolysis of the ester, $\text{CH}_3\text{COOCH}_2\text{CH}_2\text{CH}_3$, produces ethanoic acid. In an experiment, 2.04 g of the ester was used and 0.90 g of ethanoic acid was produced. The percentage yield of ethanoic acid was:

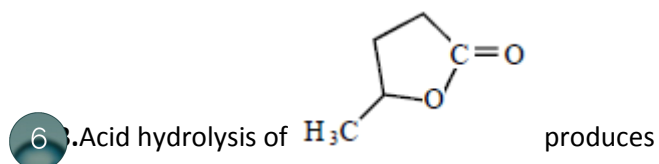
- A 44
- B 59
- C 75
- D 90

(Total 1 mark)

5. The structural formula of ethyl 2-methylpropanoate is

- A
- $$\begin{array}{c}
 \text{CH}_3 \\
 | \\
 \text{H}_3\text{C}-\text{C}-\text{O}-\text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{CH}_2\text{CH}_3 \end{array} \\
 | \\
 \text{H}
 \end{array}$$
- B
- $$\begin{array}{c}
 \text{CH}_3 \\
 | \\
 \text{H}_3\text{C}-\text{C}-\text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{O}-\text{CH}_2\text{CH}_3 \end{array} \\
 | \\
 \text{H}
 \end{array}$$
- C
- $$\begin{array}{c}
 \text{H}_2\text{C}-\text{CH}_2-\text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{O}-\text{CH}_2\text{CH}_3 \end{array} \\
 | \\
 \text{CH}_3
 \end{array}$$
- D
- $$\begin{array}{c}
 \text{CH}_3\text{CH}_2-\text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{O}-\text{C} \begin{array}{l} | \\ \text{H} \\ | \\ \text{CH}_3 \end{array} \end{array} \\
 \text{CH}_3
 \end{array}$$

(Total 1 mark)



- A $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{COOH}$
- B $\text{CH}_2(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
- C $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{OCHO}$
- D $\text{CH}_2(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_2\text{OCHO}$

(Total 1 mark)

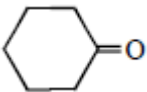
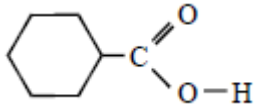
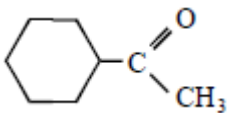
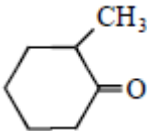
7. An excess of methanol was mixed with 12 g of ethanoic acid and an acid catalyst. At equilibrium the mixture contained 8 g of methyl ethanoate. The percentage yield of ester present was

- A 11
- B 20
- C 54
- D 67

(Total 1 mark)

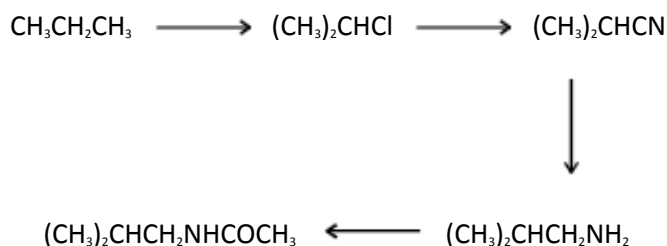
8. The compound lithium tetrahydridoaluminate(III), LiAlH_4 , is a useful reducing agent. It behaves in a similar fashion to NaBH_4 . Carbonyl compounds and carboxylic acids are reduced to alcohols. However, LiAlH_4 also reduces water in a violent reaction so that it must be used in an organic solvent.

Which one of the following can be reduced by LiAlH_4 to a primary alcohol?

- A 
- B 
- C 
- D 

(Total 1 mark)

9. Which one of the following types of reaction mechanism is **not** involved in the above sequence?



- A free-radical substitution
- B nucleophilic substitution
- C elimination
- D nucleophilic addition-elimination

(Total 1 mark)



10. Which compound is formed by the reaction of ethane-1,2-diol with an acid?

- A $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$
- B $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_2\text{CH}_2-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$
- C $\text{H}_3\text{C}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$
- D $\text{CH}_3\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_2\text{OH}$

(Total 1 mark)

11. Which one of the following would **not** react with aqueous silver nitrate to produce a precipitate that is soluble in concentrated aqueous ammonia?

- A CaBr_2
- B $[\text{COCl}_4]^{2-}$
- C $(\text{CH}_3)_4\text{N}^+\text{I}^-$
- D CH_3COCl

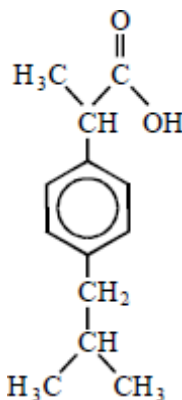
(Total 1 mark)

12. Butan-1-ol was converted into butyl propanoate by reaction with an excess of propanoic acid. In the reaction, 6.0 g of the alcohol gave 7.4 g of the ester. The percentage yield of ester was

- A 57
- B 70
- C 75
- D 81

(Total 1 mark)

13. Ibuprofen is a drug used as an alternative to aspirin for the relief of pain, fever and inflammation. The structure of ibuprofen is shown below.

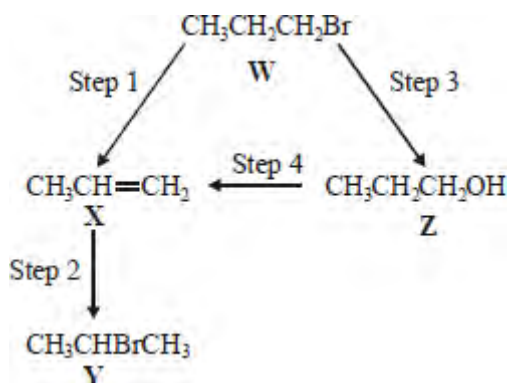


Which one of the following statements is **not** correct?

- A It has optical isomers.
- B It liberates carbon dioxide with sodium carbonate solution.
- D It undergoes esterification with ethanol.
- D It undergoes oxidation with acidified potassium dichromate(VI).

(Total 1 mark)

14. For this question refer to the reaction scheme below.



Which one of the following statements is **not** correct?

- A** Reaction of **W** with sodium cyanide followed by hydrolysis of the resulting product gives propanoic acid.
- B** Mild oxidation of **Z** produces a compound that reacts with Tollens' reagent, forming a silver mirror.
- C** **Z** reacts with ethanoic acid to produce the ester propyl ethanoate.
- C** **W** undergoes addition polymerisation to form poly(propene).

(Total 1 mark)

15. Which one of the following is **not** a correct general formula for the non-cyclic compounds listed?

- A** alcohols $\text{C}_n\text{H}_{2n+2}\text{O}$
- B** aldehydes $\text{C}_n\text{H}_{2n+1}\text{O}$
- C** esters $\text{C}_n\text{H}_{2n}\text{O}_2$
- C** primary amines $\text{C}_n\text{H}_{2n+3}\text{N}$

(Total 1 mark)

16. Propanoic acid reacts with methanol in the presence of a small amount of concentrated sulphuric acid. The empirical formula of the ester formed is

- A CH_2O
- B $\text{C}_2\text{H}_6\text{O}_2$
- C $\text{C}_2\text{H}_4\text{O}_2$
- D $\text{C}_2\text{H}_4\text{O}$

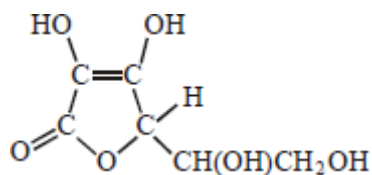
(Total 1 mark)

17. In which one of the following mixtures does a redox reaction occur?

- A ethanal and Tollens' reagent
- B ethanoyl chloride and ethanol
- C ethanal and hydrogen cyanide
- D ethanoic acid and sodium hydroxide

(Total 1 mark)

18. Which one of the following is **not** a correct statement about vitamin C, shown below?



- A It is a cyclic ester.
- B It can form a carboxylic acid on oxidation.
- C It decolourises a solution of bromine in water.
- D It is a planar molecule.

(Total 1 mark)