KayScience Separate Science Tuition (9-1)

GCSE *Separate* Chemistry

Weeks 9-12

Online Tuition

Exam Question Workbook

KayScience

1. State the first four members of the homologous series of alcohols in order.

(1)

2. Give the general formula of alcohols.

(1)

3. Write the word equation for the complete combustion of ethanol.

(2)

4. Write the symbol equation for the complete combustion of ethanol.

(2)

5. Write the word equation for when sodium reacts with ethanol.

(2)

6. Write the symbol equation for when sodium reacts with ethanol.

(2)

7. What is seen when sodium reacts with ethanol?

(2)

8. Explain the trend in reactivity of methanol, ethanol and propanol with sodium.

(3)

9. Describe how ethanol in alcoholic drinks is made.

(2)

10. Explain why alcohols are useful as solvents.

(3)

11. Describe the conditions needed to oxidise an alcohol to form a carboxylic acid.

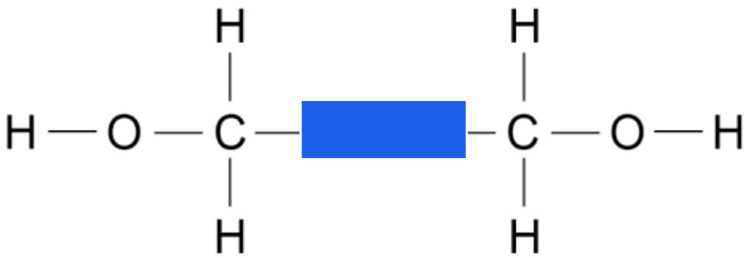
(2)

12. Explain why ethanol, propanol and butanol are members of the same homologous series.

(3)

13. Which diagram below shows an alcohol?

(1)



14. Ethanol is made by fermentation of a carbohydrate in solution, with yeast. The reaction happens at 30°C.

Explain why the reaction is happens at a temperature of 30°C and not 75°C.

(2)

1. State the first four members of the homologous series of carboxylic acids in order.

(1)

2. Write the word equation for when ethanoic acid reacts with sodium carbonate.

(2)

3. Describe how you would prove which gas is produced when a carboxylic acid reacts with a metal carbonate.

(3)

4. Explain why the rate of reaction is faster when hydrochloric acid reacts with a metal carbonate compared to a carboxylic acid.

(1)

5. Write the word equation for the reversible ionisation of ethanoic acid.

(2)

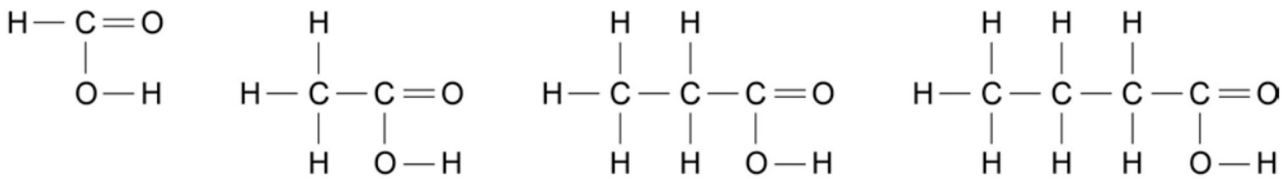
6. Write the symbol equation for the reversible ionisation of ethanoic acid.

(2)

7. Complete the table below AND circle which substance is butanoic acid:

(3)

Name	Formula
Methanoic acid	
Ethanoic acid	CH_3COOH
	CH_3CH_2COOH



8. The equation for the ionisation of ethanoic acid in water is:

$CH_3COOH(aq) \rightleftharpoons CH_3COO^-(aq) + H^+(aq)$

Explain how the above equation shows ethanoic acid is a weak acid.

(2)

9. A solution of ethanoic acid is added to zinc carbonate in a beaker on a balance.

As the reaction progresses, explain what happens to the mass of the beaker and its contents.

(3)

7. Explain, using the table below, why these compounds are in the same homologous series.

(6)

Name	Structural formula	Formula Mass	Density (g/cm^3)	Boiling point (°C)	React with alcohols?	React with sodium hydroxide solution?
butanoic acid	$CH_3CH_2CH_2COOH$	88	0.96	164	yes	yes
ethanoic acid	CH_3COOH	60	1.05	118	yes	yes
hexanoic acid	$CH_3CH_2CH_2CH_2CH_2COOH$	116	0.93	205	yes	yes
pentanoic acid	$CH_3CH_2CH_2CH_2COOH$	102	0.94	186	yes	yes
propanoic acid	CH_3CH_2COOH	74	0.99	141	yes	yes

1. What is the functional group of an ester?

(1)

2. Polyesters are made when monomers join together and lose a small molecule.

Name the small molecule lost.

(1)

3. What is the name of the reaction when esters are made?

(1)

4. Give the name of the acid used as a catalyst in the formation of an ester.

(1)

5. Write the word equation for when ethanoic acid reacts with ethanol.

(1)

6. Write the symbol equation for when ethanoic acid reacts with ethanol.

(2)

7. Give one use of esters.

(1)

8. What is condensation polymerisation?

(2)

9. What is a polyester?

(2)

10. What is the special name of the covalent bond which joins the carboxylic acid and alcohol together?

(1)

11. Write the general word equation to make a polyester.

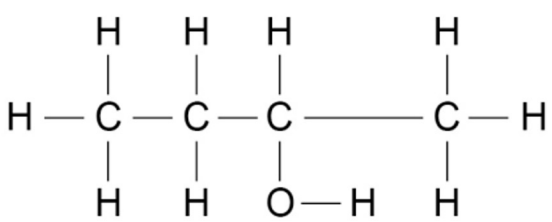
(1)

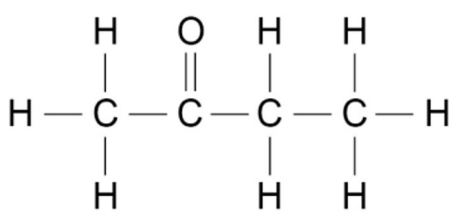
12. Give the name of the ester produced when ethanoic acid reacts with ethanol.

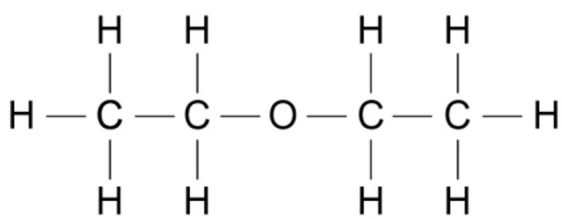
(1)

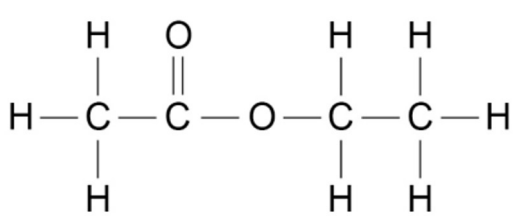
13. Circle the correct displayed structural formula of the ester produced when ethanoic acid reacts with ethanol.

(1)

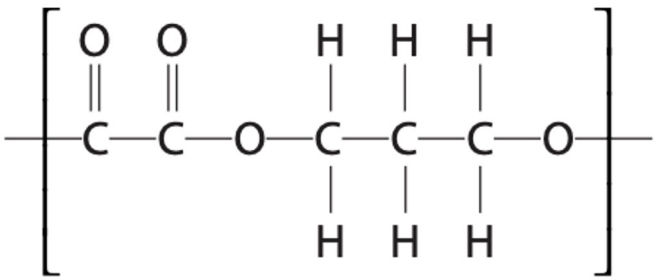








14. The below diagram shows the repeating unit of the polyester molecule formed in a reaction between a carboxylic acid and an alcohol.



State the formula of the other product formed in this reaction.

(1)

.....

15. Draw the structure of one molecule of the alcohol used to produce the polyester shown above. Make sure to show all covalent bonds..

(2)

1. What is a monomer?

(1)

2. What is a polymer?

(2)

3. Which monomer makes poly(ethene)?

(1)

4. Explain why a mixture of poly(propene) and wool is more sustainable than just using poly(propene) to make rugs.

(2)

5. Explain how poly(ethene) is formed.

(4)

6. Explain why propene can form polymers but propane cannot.

(3)

7. Give similarities and differences between addition polymerisation used to make poly(propene) and condensation polymerisation used to make a polyester.

(5)

1. What shape does DNA have?

2. Which two molecules form the DNA backbone?

3. Describe the structure of a nucleotide.

4. Which DNA bases complementary base pair to one another?

5. State the name of the bond that bonds bases together.

6. Describe the structure of DNA

1. Give the raw materials soda-lime glass is made from.

(2)

2. Describe how glass is made.

(2)

3. What is borosilicate glass used for and why?

(2)

4. Give a property of glass that makes it a useful material to make a beaker for an acid.

(1)

1. Evaluate using glass for milk bottles compared with using polymers for milk bottles.
Use your understanding of life cycle assessments (LCAs).

(6)

	Polymer	Glass
Raw materials	Crude oil	Limestone, sand and sodium carbonate
Energy to process raw materials (kilojoules)	1700	6800
Energy to manufacture bottle in (kilojoules)	100	770
Mass of bottle (grams)	30	210
Average number of times used in lifetime of bottle	1	30
One disposal method at end of useful life	Recycled	Recycled

1. Explain how ceramics are made.

(3)

2. Explain why ceramics can easily be cracked with a small knock.

(3)

3. Give a reason why a ceramic, rather than metals, is a more suitable material for washbasins.

(1)

1. What is a composite material?

(2)

2. What is the matrix in composite materials?

(1)

3. What is the reinforcement in composite materials?

(1)

4. Explain how cement can be made into 'reinforced concrete'.

(2)

5. Explain why composite glass-ceramic is not brittle.

(2)

6. Describe the physical properties of fibreglass.

(2)

1. Describe how to obtain pure, dry crystals of sodium chloride when carrying out a titration of hydrochloric acid with 25.0 cm^3 of sodium hydroxide.

(6)

1. 25.0cm³ of sodium hydroxide reacted with 20cm³ of 0.60 mol/dm³ of hydrochloric acid. What is the concentration of sodium hydroxide used, in mol/dm³?

$$NaOH + HCl \rightarrow NaCl + H_2O$$

Concentration of NaOH = ... mol/dm³ [4]

2. 30.0 cm³ of 0.75 mol/dm³ of lithium carbonate solution reacts with 0.20 mol/dm³ of hydrochloric acid. What is the volume of hydrochloric acid needed for complete neutralisation?

$$Li_2CO_3 + 2HCl \rightarrow 2LiCl + H_2O + CO_2$$

Volume of HCl = ... dm³ [4]