

Alcohols

Question Paper 1

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Organic chemistry
Sub-Topic	Alcohols
Booklet	Question Paper 1

Time Allowed: 54 minutes

Score: /45

Percentage: /100

Grade Boundaries:

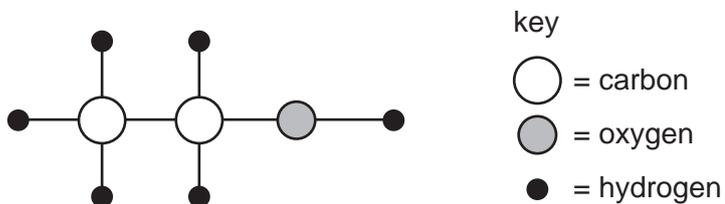
9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

- 1 Ethene reacts with Y to produce ethanol.



What is Y?

- A hydrogen
 - B oxygen
 - C steam
 - D yeast
- 2 The diagram represents the molecule of an organic compound.



What is the name of the compound?

- A ethane
 - B ethanoic acid
 - C ethanol
 - D ethene
- 3 When glucose is fermented, ethanol is formed together with
- A carbon dioxide.
 - B ethene.
 - C methane.
 - D oxygen.

- 4 Compounds containing five carbon atoms in a molecule may have names beginning with 'pent...'.
What is the name of the compound shown?

What is the name of the compound shown?



key

○ = carbon

● = oxygen

● = hydrogen

- A pentane
B pentanoic acid
C pentanol
D pentene
- 5 What is **not** essential for the formation of ethanol by fermentation?
A light
B sugar
C yeast
D water
- 6 Which row is correct for ethanol?

	burns	made by fermentation
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 7 Which statement about ethanol is **not** correct?

- A It can be used as a fuel.
B It can be used as a solvent.
C It is formed by reaction between steam and ethane.
D Its functional group is -OH.

8 Ethanol is an important chemical produced by the1..... of2..... .

Which words correctly complete gaps 1 and 2?

	1	2
A	combustion	ethane
B	combustion	glucose
C	fermentation	ethane
D	fermentation	glucose

9 The table shows the boiling points of four members of the homologous series of alcohols.

compound		boiling point / °C
name	formula	
methanol	CH ₃ OH	65
ethanol	C ₂ H ₅ OH	78
propanol	C ₃ H ₇ OH	X
butanol	C ₄ H ₉ OH	117

What is the value of X?

- A** 55 °C **B** 82 °C **C** 98 °C **D** 115 °C

10 Which of the statements about ethanol are correct?

- 1 Ethanol can be formed by an addition reaction.
- 2 Ethanol can be formed by fermentation.
- 3 When ethanol burns in air, it forms carbon dioxide and water.

- A** 1, 2 and 3 **B** 1 and 2 **C** 1 and 3 **D** 2 and 3

11 Which process is **not** used during the production of ethanol?

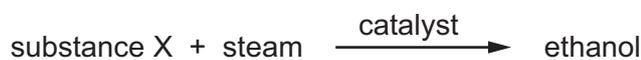
- A addition of steam to ethene
- B fermentation
- C fractional distillation
- D reacting ethane with oxygen

12 Ethanol is made by fermentation.

How is ethanol obtained from the fermentation mixture?

- A chromatography
- B crystallisation
- C electrolysis
- D fractional distillation

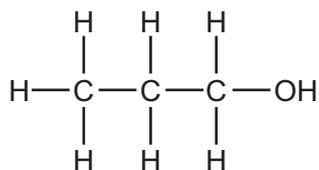
13 Ethanol can be manufactured from substance X.



What is substance X?

- A carbon dioxide
- B ethene
- C hydrogen
- D oxygen

14 Which type of compound is shown?



- A alcohol
- B alkane
- C alkene
- D carboxylic acid

15 Which statements about ethanol are correct?

- 1 It can be made by fermentation.
- 2 It is an unsaturated compound.
- 3 It burns in air and can be used as a fuel.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

16 Ethanol is produced from either ethene or sugar.

Which type of chemical reaction is used in each case?

	ethene → ethanol	sugar → ethanol
A	addition	fermentation
B	addition	fractional distillation
C	distillation	fermentation
D	distillation	fractional distillation

17 Ethanol can be formed by

- 1 fermentation
- 2 reaction between steam and ethene

Which of these processes uses a catalyst?

	1	2
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

21 Which row correctly describes the production of ethanol and its properties?

	can be made from glucose	can be made from ethene	is used as a fuel	is used as a solvent
A	✓	✓	✓	✓
B	✓	x	✓	✓
C	x	✓	✓	x
D	x	✓	x	✓

22 Which statement about the names of organic compounds is correct?

- A** Compounds containing C=C double bonds are alkanes.
- B** The compound of formula $\text{CH}_3\text{CO}_2\text{H}$ is methanoic acid.
- C** The compound of formula C_2H_4 is ethane.
- D** The compound of formula $\text{C}_2\text{H}_5\text{OH}$ is an alcohol.

23 Ethanol is manufactured from petroleum by reacting ethene with steam.

Which statements about this process are correct?

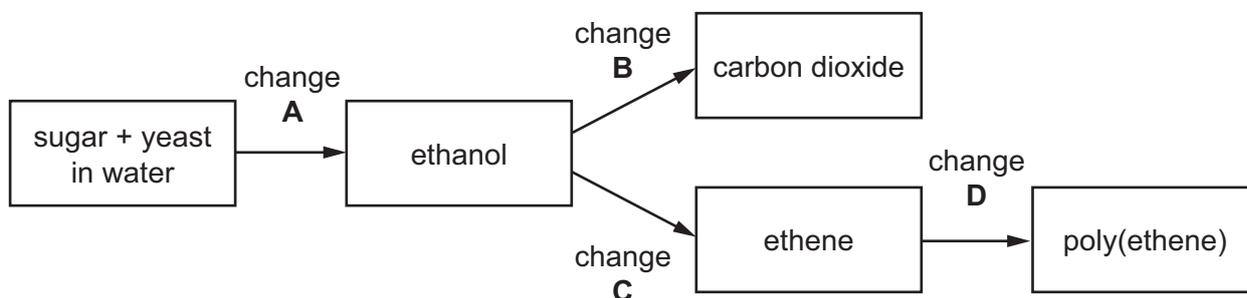
- 1 Ethene is obtained from the cracking of alkanes.
- 2 The process is carried out in the presence of yeast.
- 3 The reaction is an addition reaction.
- 4 The rate of reaction is increased by a catalyst.

- A** 1 and 3 only **B** 1 and 4 only **C** 1, 2 and 3 **D** 1, 3 and 4

- 24 What is used in the production of ethanol from ethene?
- A hydrogen and oxygen
 - B oxygen only
 - C steam
 - D yeast
- 25 Which term describes the formation of ethanol from glucose?
- A cracking
 - B distillation
 - C fermentation
 - D polymerisation
- 26 Which statement about ethanol is correct?
- A It burns in air to form ethene and water.
 - B It is prepared from ethene by fermentation.
 - C It is prepared from glucose in an addition reaction.
 - D It is the only product when ethene reacts with steam.
- 27 What is an advantage of producing ethanol by fermentation of sugar compared to the catalytic addition of steam to ethene?
- A The alcohol produced is purer.
 - B The process is faster.
 - C The process uses high temperature.
 - D The process uses renewable raw materials.
- 28 Which bond is **not** present in the structure of ethanol, $\text{CH}_3\text{CH}_2\text{OH}$?
- A C–C
 - B H–H
 - C H–O
 - D O–C

29 Which change on the diagram involves combustion?

Some of the reaction products are not shown on the diagram.



30 The statements below are about the alcohol homologous series.

The alcohols have the same1..... formula.

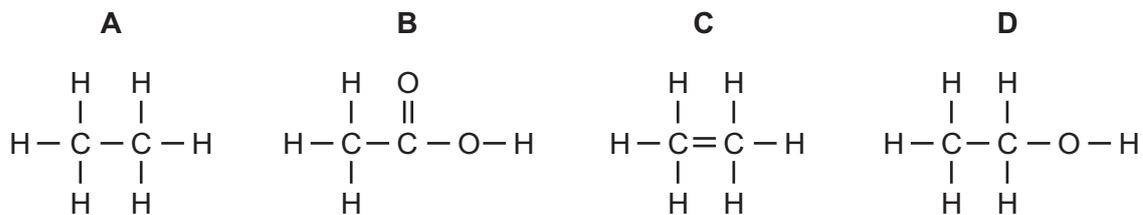
The alcohols have2..... chemical properties because they have the same3..... .

The melting points of the alcohols4..... as the number of carbon atoms increases.

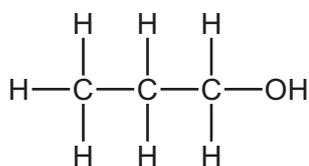
Which words correctly complete gaps 1–4?

	1	2	3	4
A	general	different	functional group	decrease
B	general	similar	electronic structure	increase
C	general	similar	functional group	increase
D	molecular	similar	functional group	increase

31 Which structure is **incorrect**?



32 The structure of compound R is shown.



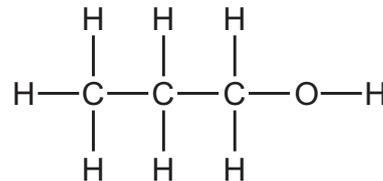
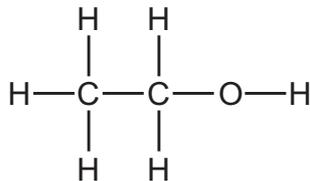
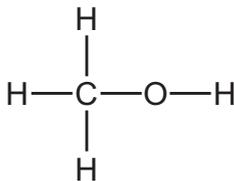
What is R?

- A propane
- B propanoic acid
- C propanol
- D propene

33 What are the products of the complete combustion of ethanol?

- A $\text{CO} + \text{H}_2$
- B $\text{CO} + \text{H}_2\text{O}$
- C $\text{CO}_2 + \text{H}_2$
- D $\text{CO}_2 + \text{H}_2\text{O}$

34 The structures of three substances are shown.



Why do these substances all belong to the same homologous series?

- A They are all compounds.
- B They are all saturated.
- C They all contain oxygen.
- D They all contain the same functional group.

35 There are two methods for producing ethanol.

method 1 catalytic addition of steam to ethene

method 2 fermentation

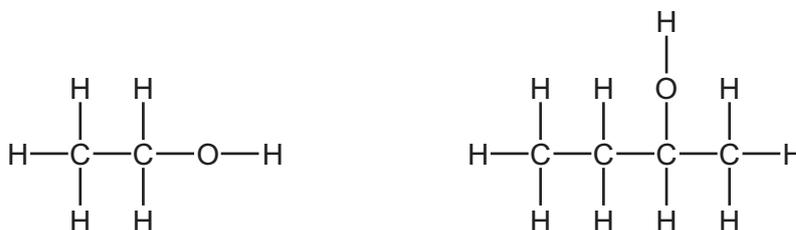
Which statement is **not** correct?

- A Method 1 produces carbon dioxide.
- B Method 1 requires high temperature and pressure.
- C Method 2 produces carbon dioxide.
- D Method 2 requires a source of sugar.

36 Which reaction is used to manufacture ethanol?

- A reacting ethane with oxygen in the presence of a catalyst
- B reacting ethane with steam in the presence of a catalyst
- C reacting ethene with steam in the presence of a catalyst
- D reacting glucose with steam in the presence of a catalyst

37 The diagram shows the structures of two organic molecules.



Which statement about these molecules is **not** correct?

- A They are both alcohols.
- B They both produce carbon dioxide and water when they burn in oxygen.
- C They contain different functional groups.
- D They have the same general formula.

38 Ethanol is manufactured by fermentation or by the catalytic addition of steam to ethene.

Which statement is correct?

- A Fermentation uses a higher temperature than the catalytic addition of steam to ethene.
- B Fermentation uses a non-renewable resource.
- C The catalytic addition of steam to ethene produces purer ethanol than fermentation.
- D The catalytic addition of steam to ethene uses a biological catalyst.

39 Ethanol is manufactured by fermentation or by the catalytic addition of steam to ethene.

What is an advantage of ethanol manufacture by fermentation instead of by the catalytic addition of steam to ethene?

- A Ethanol manufactured by fermentation is purified by distillation.
- B Ethanol manufacture by fermentation produces purer ethanol.
- C Ethanol manufacture by fermentation uses large areas of land.
- D Ethanol manufacture by fermentation uses renewable resources.

40 Ethanol can be produced by fermentation or by the catalytic addition of steam to ethene.

Which row shows an advantage and a disadvantage for each process?

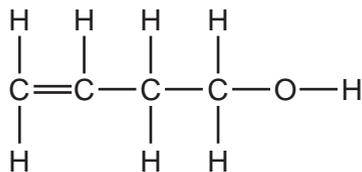
	fermentation		catalytic addition of steam to ethene	
	advantage	disadvantage	advantage	disadvantage
A	batch process	slow reaction	continuous process	fast reaction
B	fast reaction	continuous process	pure ethanol formed	renewable raw material
C	renewable raw material	batch process	pure ethanol formed	slow reaction
D	renewable raw material	impure ethanol formed	fast reaction	finite raw material

41 Ethanol is produced from either ethene or sugar.

Which type of chemical reaction is used in each case?

	ethene → ethanol	sugar → ethanol
A	addition	fermentation
B	addition	fractional distillation
C	distillation	fermentation
D	distillation	fractional distillation

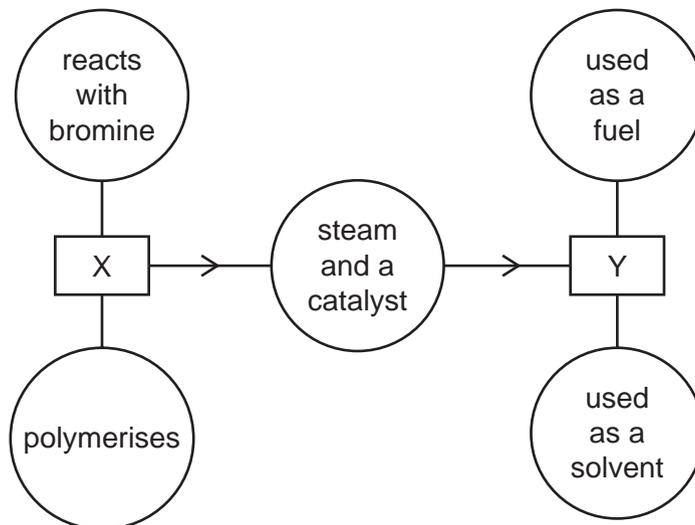
42 The diagram shows the structure of a compound.



To which classes of compound does this molecule belong?

	alkane	alkene	alcohol
A	no	no	no
B	no	yes	yes
C	yes	no	yes
D	yes	yes	yes

43 The diagram shows some properties of two organic compounds X and Y.



What are X and Y?

	X	Y
A	ethane	ethanoic acid
B	ethane	ethanol
C	ethene	ethanoic acid
D	ethene	ethanol

44 Carbon dioxide is produced when

X reacts with ethanol.

Y reacts with sodium carbonate.

What are X and Y?

	X	Y
A	H ₂	HCl
B	H ₂	NaOH
C	O ₂	HCl
D	O ₂	NaOH

45 Two reactions are shown.

1 butane → ethene

2 ethene → ethanol

Which terms describe reactions 1 and 2?

	1	2
A	cracking	addition
B	cracking	combustion
C	distillation	addition
D	distillation	combustion