

SCIENCE (Chemistry)
ORGANIC CHEMISTRY (Alcohol)

Name: _____ () Class: _____ Date: _____

Exercise 5

- 1) What is the general formula of alcohol? _____
- 2) Which group of letters is present in the chemical names of all alcohols? _____
- 3) They contain the _____ group of atoms
- 4) Complete the following table of alcohol.

No of carbon atoms in one molecule	Chemical name	Molecular formula	Structural formula of one molecules	Relative molecular mass	Boiling point(⁰ C)	State under room condition
1		CH ₃ OH			64	
2					78	
3			<pre> H H H H - C - C - C - O - H H H H </pre>		97	
4	Butanol	C ₄ H ₉ OH			118	

*Most alcohols are liquid and are soluble in water.

- 5) In the alcohol homologous series,
 - i) _____
 - ii) _____
 - iii) _____
- 6) Write the molecular formula and structural formula of the alcohol with 5 carbon atoms in one molecule.

Reaction to produce ethanol

7) Fermentation of sugar with yeast.

yeast

Sugar/Starch $\longrightarrow$ ethanol + carbon dioxide

- i) What needs to be added to the sugar solution so that fermentation can take place? _____
- ii) At which of the following temperature is the water bath kept? Why?
- a) 17°C b) 37°C c) 57°C d) 77°C () _____
- iii) What changes would you observe in the apparatus?

- iv) The fermentation stops when the percent of ethanol in the mixture is about 10%. What is the reason for this? _____
- v) Name the 2 different alcoholic drinks which are produced by fermentation. _____

8) Reacting ethene with steam

- i) Ethanol can be made by fermentation. What is another way which ethanol is manufactured in industry? _____
- ii) Write a balanced chemical equation for this reaction?

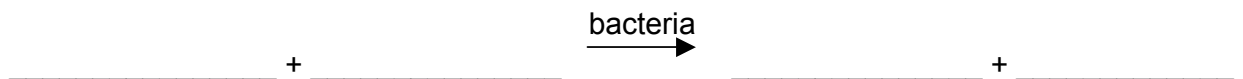
Reaction of ethanol

a) Combustion

- 9) Ethanol burns in air. In some countries, ethanol is used as a fuel for motor vehicles in place of petrol.
- i) Write a balanced chemical equation to show how energy is obtained from ethanol.

b) Oxidisation

- 10) i) Ethanol can be oxidised by air to produce an organic acid called ethanoic acid. This reaction takes place in the presence of bacteria from the air. Write a balanced chemical equation of this reaction.



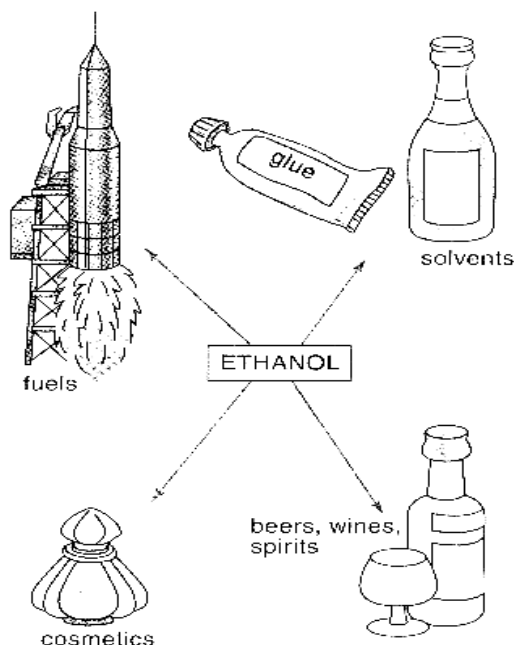
- ii) Wine is a dilute aqueous solution of ethanol plus flavouring. When wine is left exposed to air it soon becomes sour or acidic in taste. Which chemical change explain this fact?

iii) A dilute solution of ethanoic acid is called _____.

Uses of ethanol

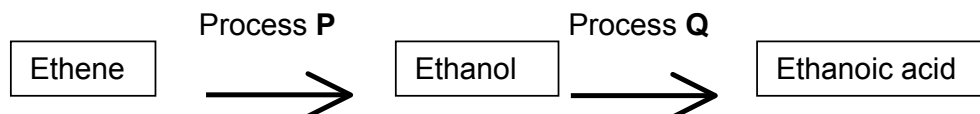
11) Name the 3 uses of ethanol.

- found in _____ such as beer and wine.
- Used as a _____ for other organic compounds such as varnishes, paints, perfumes, cosmetics and deodorants.
- _____ for motor vehicles, rocket.



Optional Homework

1) The flow diagram shows how ethene can be changed into ethanoic acid.



- What type of reaction is process **P**? _____
 - Complete this equation. $C_2H_4 + \text{_____} \longrightarrow C_2H_5OH$
 - What type of reaction is process **Q**? _____
 - Complete this equation. $C_2H_5OH + \text{_____} \longrightarrow CH_3COOH + H_2O$
- 2) a) Ethanol is a good solvent and is commonly used in cosmetics and perfumes.
- Does ethanol dissolve covalent or ionic substances? _____
 - Which is more 'volatile': ethanol(b.p. $78^{\circ}C$) or water(b.p. $100^{\circ}C$)? _____
 - Why is ethanol a better solvent than water for perfumes? _____

b) Give 2 other common commercial uses of ethanol. _____