

## QUESTIONS:

- Q1. What is a Catalyst?
- Q2. Under the intoxicating liquor act, what is the legal age for drinking and buying alcohol?
- Q3. What are the negative short term and long-term effects of drinking alcohol?
- Q4. State two industrial uses for alcohols.
- Q5. What is the word equation for fermentation?
- Q6. What is the chemical equation for fermentation?
- Q7. Alcoholic drinks express the concentration of their solution in % volume per volume. (% v/v) Explain the meaning of the concentration 12 % v/v.
- Q8. 120 ml of wine contains 15 ml of ethanol. What is the concentration in this solution?
- Q9. Create a molecule of ethanol using molecular models. Using the model, describe the shape of the ethanol molecule.
- Q10. Why is it impossible to produce alcoholic drinks of 40% v/v by fermentation alone?
- Q11. Name the alcohol found in alcoholic drinks.
- Q12. Define the term 'functional group' and identify the functional group of alcohols.
- Q13. Draw the structural formula for ethanol.
- Q14. Why is the boiling point for ethanol higher than alkanes boiling point?
- Q15. What chemical drying agent is added to remove water from ethanol?
- Q16. What is the difference between brewing and distilling? Give one similarity in the process of brewing and distilling.
- Q17. True/ False. The solubility of alcohols decreases as the length of the carbon chains increases.
- Q18. Alcohols can be classified as primary, secondary or tertiary. Distinguish between the structure of a primary and a secondary alcohol?
- Q19. Name the following alcohols.
- Q20. To which homologous series does ethanol belong to?
- Q21. Explain the term 'homologous series'.
- Q22. Alcohols can be readily converted to carboxylic acids. What type of organic reaction is involved?
- Q23. What kind of reaction converts ethanol to ethene?

## SAMPLE SOLUTIONS:

Q1. A catalyst is a substance that increases the speed of a chemical reaction without being consumed by the reaction.

Q2. 18 years

Q3.

### SHORT-TERM EFFECTS

- Disturbed sleep
- Anxiety or stress
- Memory loss or blackouts
- Excessive mood changes
- Sweating or shaking
- Blurred vision
- Headache
- Loss of appetite
- Slower reflexes
- Impaired judgement
- Diarrhoea
- Nausea
- Bad skin
- Weight gain

### LONG-TERM EFFECTS

- Alcohol dependency
- High blood pressure
- Liver disease
- Cancers
- Mental health problems
- Infertility
- Heart disease
- Stomach ulcers
- Osteoporosis
- Pancreatitis
- Stroke
- Dementia
- Brain damage
- Sexual health problems

Image from [Drinkaware.ie](http://Drinkaware.ie)

Q4. Methanol is used in the manufacture of paints and varnishes.

Ethanol is used in the brewing industry to manufacture beer and cider. It is also used in the distilling industry to manufacture spirits. Other uses include:

- Manufacture of detergents, soaps, and shampoos. (+ 11 carbon atoms)
- Used in the Manufacture of plastics (6 – 8 carbon atoms)
- Used as an antifreeze in automobile radiators.

Q5. Glucose  $\rightarrow$  Ethanol + Carbon Dioxide (*Yeast is the catalyst in the reaction*)

Q6.  $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

Q7. 12 cm<sup>3</sup> ethanol per 100 cm<sup>3</sup> solution.

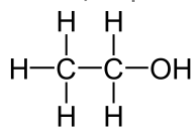
Q8. 12.5 %

Q9. The shape around the carbon atoms is a tetrahedral shape. The bond angle in a tetrahedral shape is 109.5°. The –OH part of the ethanol is V-Shaped. The bond angle in a V-Shaped is 104.5°.

Q10. It is impossible to produce alcoholic drinks of 40% v/v by fermentation alone because the ethanol that the yeast cells produce during fermentation eventually kills the yeast. The fermentation process is then stopped. To produce alcoholic drinks of a higher concentration, the fermented liquid must be distilled.

Q11. Ethanol  $C_6H_{12}O_6$

Q12. Is an atom or group of atoms responsible for the common properties of certain compounds, especially organic compounds. The functional group of alcohols is –OH.



Q13.

Q14. Alcohols have higher boiling points than their corresponding alkane because the –OH group gives rise to hydrogen bonding. Extra energy is needed to break the hydrogen bonds

thus it has a higher boiling point.

Q15. Add Calcium Oxide (CaO) or Potassium Carbonate to absorb the water.

Q16. Brewing is the process to manufacture beer, wine and ciders while distillation is the process of manufacturing spirits (Alcoholic beverages with a higher concentration).

Fermentation is an important part of both the brewing and distilling process.

Q17. True

Q18.

Primary Alcohols:

The carbon with the OH is joined to one other carbon atom. (or none in the case of methanol)

Secondary Alcohols:

The carbon with the OH is joined to two other carbon atoms.

Tertiary Alcohols:

The carbon with the OH is joined to three other carbon atom.

Q19. Name the following alcohols.

Q20. Alcohol

Q21. Homologous Series:

Is a series of compounds with the same functional group and similar chemical properties.

Q22. Oxidation reaction

Q23. Dehydration reaction