

Section A

1. Complete the word equation for fermentation.

Glucose → _____ + _____

2. Which explains why fermentation is an anaerobic process?

Tick () **one** box.

- A. It takes place in the presence of oxygen
- B. It takes place in the absence of oxygen
- C. It involves anaerobic respiration

3. Choose the most suitable temperature for fermentation to take place.

Tick () **one** box.

- A. 10 °C
- B. 30 °C
- C. 40 °C

4. Complete the structural formula for ethanol:



5. Give a use for ethanol other than in alcoholic drinks.

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6. Give a use for the other product of fermentation.
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Section B

7. The flowchart shows some of the substances involved in the production of ethanol.
- Name the process that can be used to make ethanol from plant sugars.

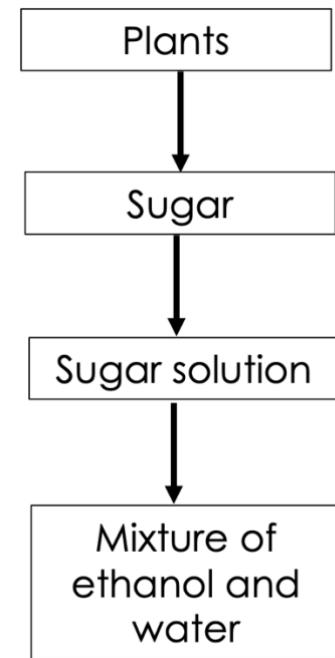
b. Describe how the sugar solution is used to produce the mixture of ethanol and water.

- c. Describe the advantages and disadvantages of this method of producing ethanol.

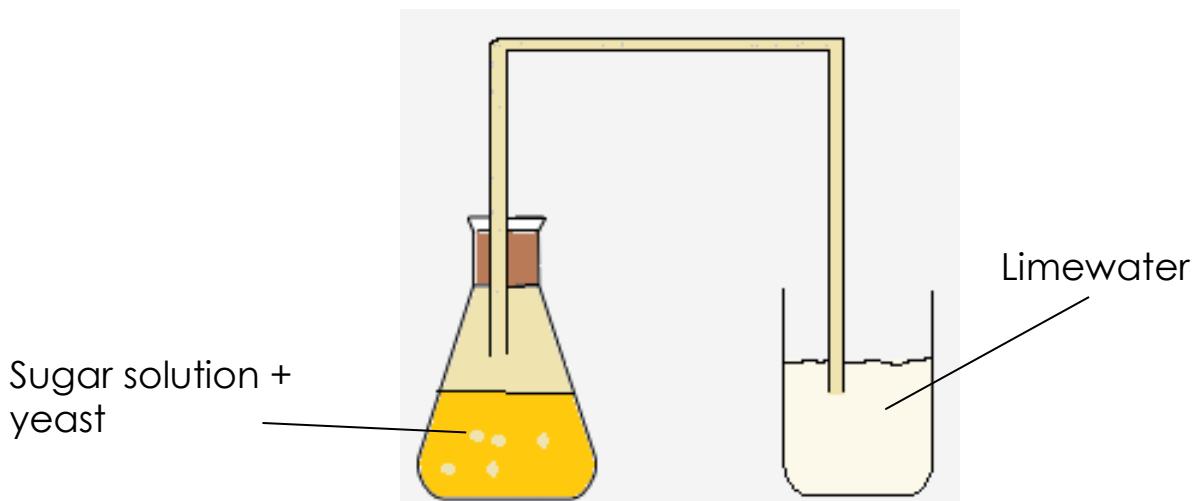
- d. Describe how ethanol could be separated from the mixture of ethanol and water.
Ethanol has a boiling point of 78 °C and water has a boiling point of 100 °C.

- e. Ethanol made by this method can be used as a biofuel. Suggest the impact this may have on food security.

- f. Explain why burning biofuels contributes less to global warming than burning fossil fuels.



g. The apparatus below shows how ethanol can be made from sugar solution and yeast.



i. Describe and explain the change that would be seen in the limewater.

ii. Once the reaction has taken place, the solid yeast can be separated from the solution.
Describe how the solid yeast could be separated from the solution.

Section C

8. Ethanol can be produced by fermentation.
- Name the microorganism that is added to a sugar solution to produce ethanol.
 - Enzymes in the microorganism increase the rate of reaction. Define an enzyme.
 - Explain what is meant by the lock-and-key model of enzyme activity.
 - Define the optimum temperature of an enzyme.
 - Describe what happens to an enzyme when it is heated too much.

