

**N5 Chemistry**  
**Unit 2: Nature's Chemistry**  
**Homework 2.6**

1. Different isotopes of the same element have identical

- A electron arrangements
- B nuclei
- C numbers of neutrons
- D mass numbers.

Answer \_\_\_\_\_

2. Which of the following chlorides conducts electricity when molten?

- A Calcium chloride
- B Nitrogen chloride
- C Phosphorus chloride
- D Silicon chloride

Answer \_\_\_\_\_

3. Which of the following substances is **not** a salt?

- A Copper sulfate
- B Sodium oxide
- C Magnesium chloride
- D Calcium nitrate

Answer \_\_\_\_\_

4. Which of the following pairs of elements combine to form an ionic compounds?

- A Lead and fluorine
- B Sulfur and oxygen
- C Carbon and nitrogen
- D Phosphorus and chlorine

Answer \_\_\_\_\_

5. Which of the following alkanes will produce 3 moles of carbon dioxide when 1 mole of it is completely burned?

- A Ethane
- B Propane
- C Butane
- D Pentane

Answer \_\_\_\_\_

6. Which line in the table correctly shows the two families of compounds which react together to produce esters?

|   |                 |             |
|---|-----------------|-------------|
| A | carboxylic acid | cycloalkane |
| B | alcohol         | alkene      |
| C | cycloalkane     | alkene      |
| D | carboxylic acid | alcohol     |

Answer \_\_\_\_\_

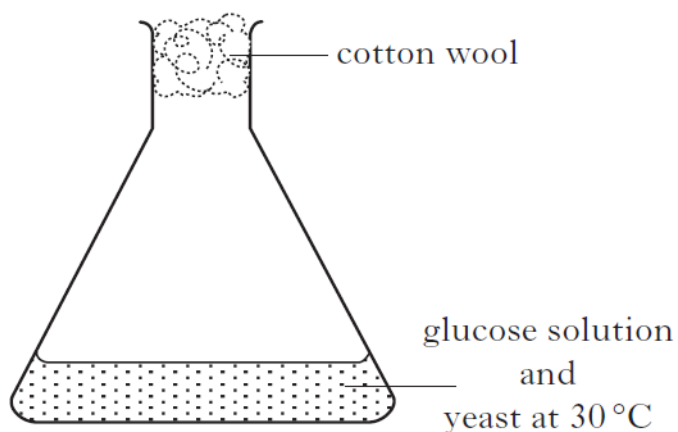
7. An alcohol was burned and the energy released was absorbed by 100 cm<sup>3</sup> of water. Calculate the heat energy absorbed if the temperature of the water increased by 30°C.

You may wish to use the data booklet.

- A 1.25 kJ
- B 12.5 kJ
- C 1250 kJ
- D 125 000 kJ

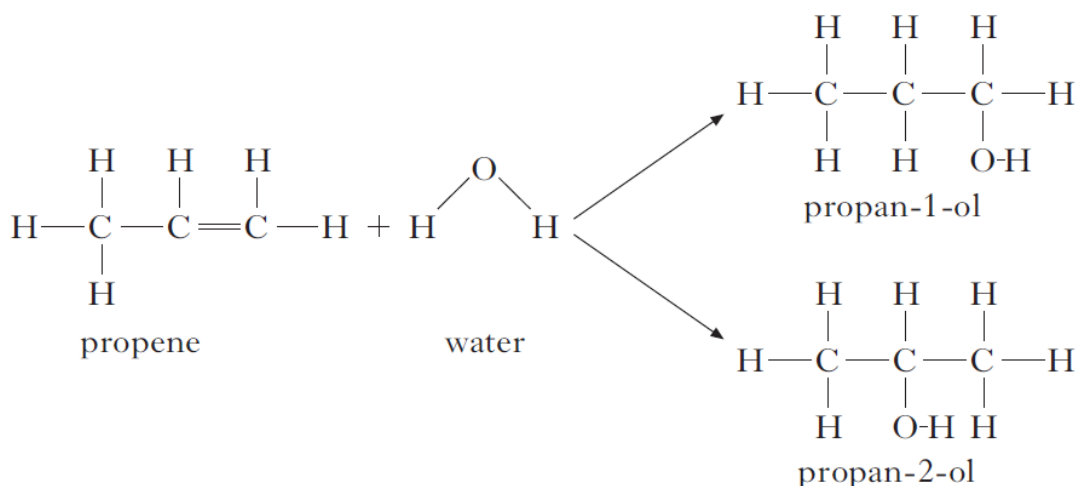
Answer \_\_\_\_\_

8. Ethanol is the alcohol found in alcoholic drinks. It can be produced as shown in the diagram.



- a) i) Name the type of chemical reaction taking place in the flask.  
\_\_\_\_\_ 1
- ii) What would happen to the rate of the reaction if the experiment above was repeated at 50°C?  
\_\_\_\_\_ 1

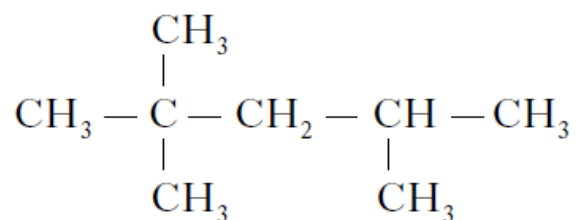
b) In industry, alcohols can be produced from alkenes as shown in the example below.



- i) Name the type of chemical reaction taking place.  
\_\_\_\_\_ 1
- ii) What term is used to describe a pair of alcohols like propan-1-ol and propan-2-ol?  
\_\_\_\_\_ 1
- iii) Propan-1-ol and propan-2-ol have different boiling points. Name the process which could be used to separate a mixture of these alcohols.  
\_\_\_\_\_ 1
- c) Alcohols react with carboxylic acids to produce compounds with sweet-smells. Name the type of compound formed when an alcohol reacts with a carboxylic acid.  
\_\_\_\_\_ 1

9. Petrol is a complex blend of many chemicals.

a) A typical hydrocarbon found in petrol is shown below.



Give the systematic name for this compound.

\_\_\_\_\_ 1

b) Name the two products formed when this compound burns in a plentiful supply of oxygen.

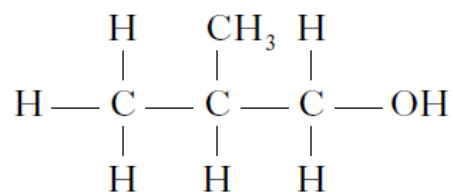
\_\_\_\_\_ 1

c) The ester methyl stearate is also a useful vehicle fuel. Give another use for esters.

\_\_\_\_\_ 1

10. Hairspray is a mixture of chemicals.

a) 2-methylpropan-1-ol is an alcohol which is added to hairspray to help it dry quickly on the hair.



Draw a structural formula for an alcohol that is an isomer of 2-methylpropan-1-ol.

1

b) One container of hairspray contains 14.8 grams of 2-methylpropan-1-ol.  
Calculate the number of moles of 2-methylpropan-1-ol in the container.

\_\_\_\_\_ moles

2

11. The energy released when 1 mole of some alcohols burn is shown in the table.

| Name of alcohol | Energy released/ $\text{kJ mol}^{-1}$ |
|-----------------|---------------------------------------|
| methanol        | 727                                   |
| ethanol         | 1367                                  |
| propan-1-ol     | 2020                                  |

a) Using this data, predict the energy released when one mole of butan-1-ol burns.

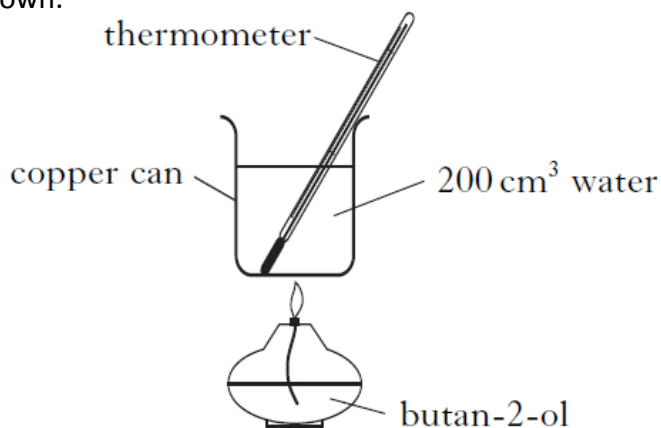
\_\_\_\_\_  $\text{kJ mol}^{-1}$

1

b) Draw the structural formula for methanol.

1

c) A value for the heat released when 1 g of butan-2-ol can be determined experimentally using the apparatus shown.



Mass of butan-2-ol burned = 1.0 g  
Temperature rise of water = 40 °C

Calculate the energy absorbed by the water from the data given.

*Space for working and answer*

\_\_\_\_\_ kJ.

3

Total Marks 24