

# SCIENCE

## INTERACTIVE ASSESSMENT QUESTIONS BASED ON STANDARD PRACTICAL EXERCISES FOR REVISION AND EXAMINATION PRACTICE

### Chemistry Part 3

#### LEARNING VERSION

IN THIS LEARNING VERSION ANSWERS ARE IMMEDIATELY AND VISIBLY MARKED, CORRECT ANSWERS ARE INDICATED ON REQUEST, AND END OF SECTION TOTALS AND PERCENTAGES SHOWN ON SCREEN.

SOME OF THE MORE DIFFICULT QUESTIONS HAVE DROP DOWN HELP BOXES WHICH REVEAL INFORMATION WHEN THE CURSOR IS PASSED OVER THE QUESTION MARK.

WHEN PRINTED OUT ONLY THE QUESTIONS SHOW, THEREFORE THIS CAN BE USED AS A PAPER VERSION FOR TESTS IF REQUIRED.

The questions are of the Multiple Choice style, where the phrase “Which ONE of the following ...” is implied, but is not always stated. So that students are reminded of the type of question that requires short written answers, which unfortunately cannot be automatically marked, each topic has one short passage with missing words, which must be identified in their correct sequence.

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**NB** The practical work presented should be familiar to students, either as **demonstrations** or as **procedures** they might have carried out themselves in the lab.

The material is NOT presented as a practical guide, and while the methods followed **safety guidelines**, **specific safety issues are NOT dealt with**. Visit [www.cleapps.org.uk](http://www.cleapps.org.uk)

## CONTENTS

The following practical topics have been selected according to exam question frequency to form the basis of revision and examination practice.

FOR THE CORRECT FINAL TOTAL AND PERCENTAGE THE ENTER BUTTON AT THE BOTTOM LEFT OF EACH PAGE MUST BE CLICKED ON.

### Part 1

Reactivity series

Displacement

Alkali metals

### Part 2

Neutralisation

Rate of reaction

Electrolysis

### Part 3

Hydrocarbons and fractional distillation

Cracking hydrocarbons

Bromine water test

● Hydrocarbons and Fractional Distillation

Hydrocarbons are compounds containing hydrogen and carbon only. They are a commercially important group of compounds, crude oil is a major source of hydrocarbons. Crude oil was formed millions of years ago by the effects of temperature and pressure upon deposits of incompletely decayed microscopic sea creatures called plankton. Oil is known as a fossil fuel.

1. Which one of the following correctly describes a hydrocarbon.

- A - A compound of hydrogen, carbon, and oxygen only.
- B - A compound of hydrogen and carbon only.
- C - A compound of water and carbon only.
- D - A compound of hydrogen and carbon dioxide only.

2. Which one of the following formulae represents a hydrocarbon?

- A -  $C_2H_6$
- B -  $CO_2$
- C -  $NaHCO_3$
- D -  $HCOOH$

**HELP BOX**

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTIONS  
3 & 4



Hydrocarbons with smaller molecules have lower boiling points than hydrocarbons with larger molecules.

3. Which one of the following compounds has the lowest boiling point?

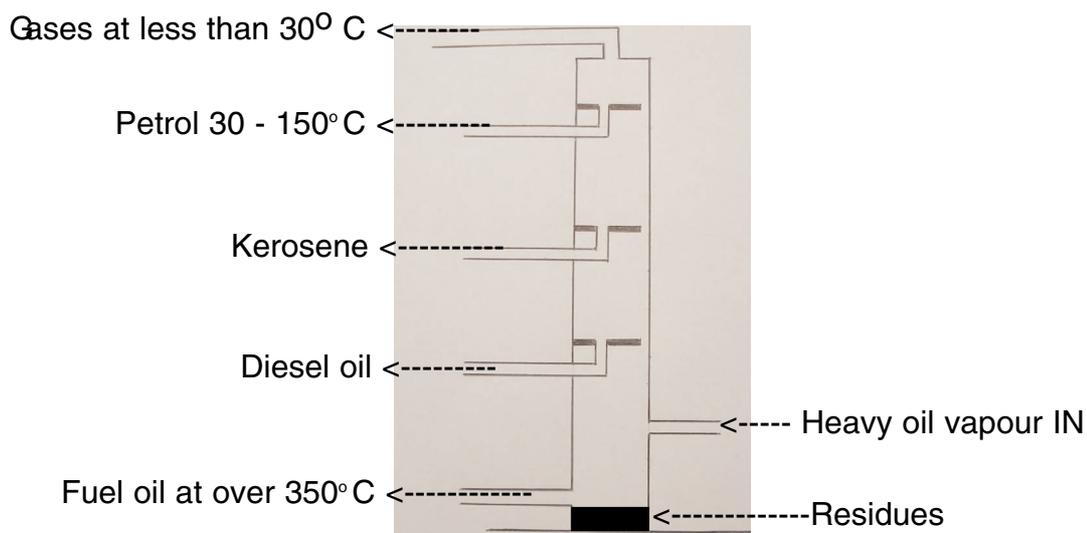
- A -  $C_{10}H_{22}$
- B -  $C_6H_{14}$
- C -  $C_8H_{18}$
- D -  $CH_4$

4. Which one of the following compounds has the highest boiling point?

- A -  $CH_4$
- B -  $C_6H_{14}$
- C -  $C_8H_{18}$
- D -  $C_{10}H_{22}$

● Hydrocarbons and Fractional Distillation

Crude oil is refined at an oil refinery. Here the oil is separated using a fractionating column. This involves heating the oil and condensing the different fractions at a range of different temperatures. The fractionating column is cooler at the top and hotter at the bottom. Crude oil is composed of hydrocarbons. Larger hydrocarbons condense lower in the column, and smaller hydrocarbons condense higher in the column.



### HELP BOX

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTIONS  
**5 & 6**



5. Which one of the following would form the residues fraction at the bottom of the fractionating column?

- A - Kerosene
- B - Petrol
- C - Bitumen
- D - Diesel

6. The following passage has words missing.

*Crude oil is separated into fractions using a fractionating column.. At the top of the fractionating column \_\_ hydrocarbons will be collected whereas at the bottom \_\_ hydrocarbons will be collected. At the top of the column the hydrocarbons have \_\_ boiling points and at the bottom of the column they have \_\_ boiling points.*

Which one of the following has the missing words in the correct sequence as they should appear in the passage.

- A - large - small - higher - lower
- B - large - small - lower - higher
- C - small - large - higher - lower
- D - small - large - lower - higher



● Hydrocarbons and Fractional Distillation

7. Two of the fractions obtained from fractional distillation are petrol and LPG. LPG contains ethane. Which one of the following is the correct formula for ethane?

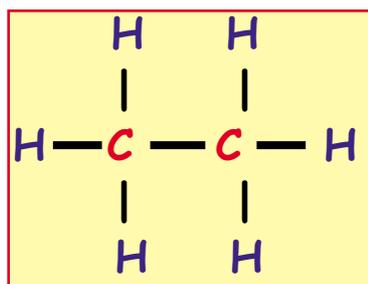
A -  $C_2H_6$

B -  $CH_4$

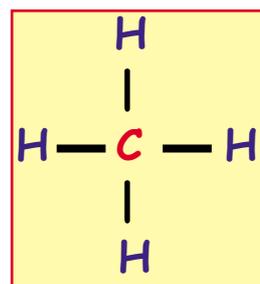
C -  $C_3H_8$

D -  $C_2H_4$

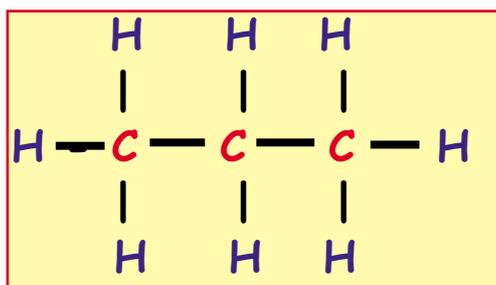
8. Which of the following is the correct structural formula for ethane?



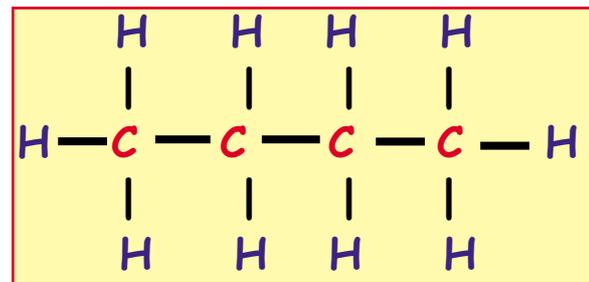
Formula 1



Formula 2



Formula 3



Formula 4

A - Formula 4

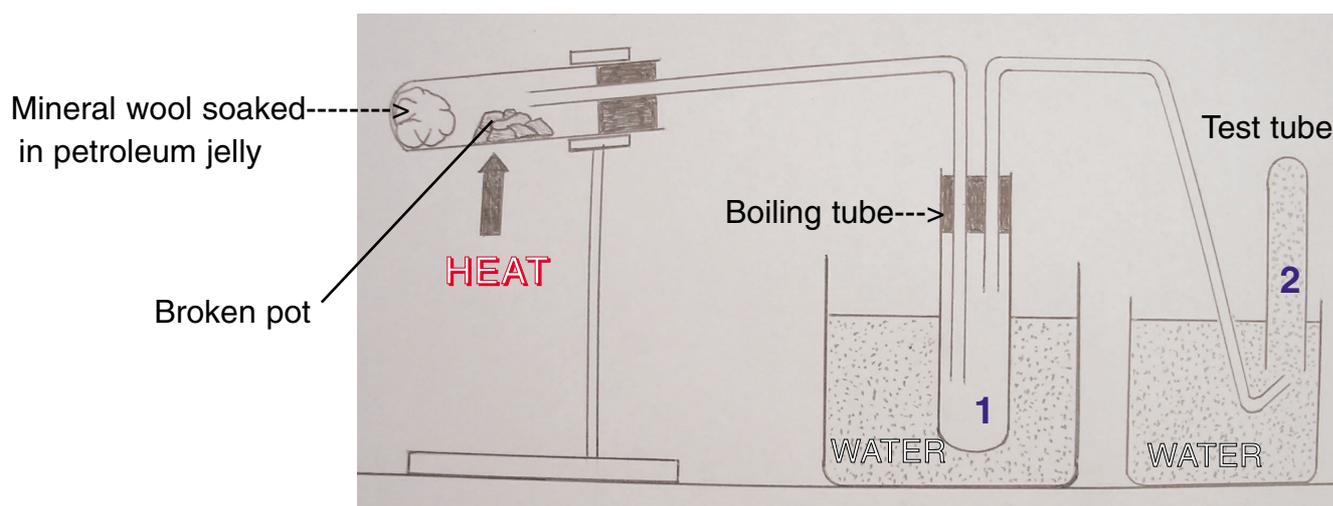
B - Formula 2

C - Formula 3

D - Formula 1

● Cracking hydrocarbons

Once crude oil has been separated in the fractionating column some of the individual fractions can then be cracked. Cracking is the breaking down of large hydrocarbon molecules such as petroleum into smaller ones. The process involves both the heating of the large hydrocarbon and the use of a catalyst. The apparatus below can be used to demonstrate 'cracking' in the lab.



9. From the following alternatives choose the one correct use of the broken pot.

- A - It acts as a catalyst.
- B - It absorbs heat.
- C - It stops the reaction from proceeding too quickly.
- D - It stabilises the tube.

10. Which one of the following best describes why cracking is an example of thermal decomposition?

- A - It forms large molecules using heat energy.
- B - It releases a large amount of heat energy.
- C - It causes the catalyst to release heat energy.
- D - It involves the breakdown of molecules using heat energy.

11. Which one of the following pairs correctly describes what will be collected in the boiling tube (1) and the test tube (2) in the diagram?

- A - (1) gas (2) gas
- B - (1) liquid (2) liquid
- C - (1) liquid (2) gas
- D - (1) gas (2) liquid

● Cracking hydrocarbons

**12.** From the following alternatives choose the best description of the products derived from the cracking of large hydrocarbons.

- A** - Compounds with double bonds only.  
**B** - A mixture of saturated and unsaturated compounds.  
**C** - Compounds with single bonds only.  
**D** - Hydrogen carbonate compounds.

**13.** The following passage has words missing.

*Fractional \_\_ of crude oil does not yield products in the correct proportions required commercially. \_\_ involves the breaking down of large \_\_ molecules with higher boiling points into smaller more useful ones with lower boiling points eg petrol and \_\_.*

Which one of the following has the missing words in the correct sequence as they should appear in the passage.

- A** - cracking - distillation - hydrocarbon - alkenes  
**B** - distillation - cracking - carbohydrate - alkenes  
**C** - distillation - cracking - hydrocarbon - alkenes  
**D** - cracking - distillation - alkene - hydrocarbons

## ● Bromine water test

**HELP BOX**

PASS CURSOR OVER  
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FOR HELP WITH  
QUESTION  
NUMBER **14**



Unsaturated hydrocarbons contain a double bond between carbon atoms. Compounds with a double bond decolourise Bromine water.

The Bromine water test is used to detect some of the products of cracking large hydrocarbons. Bromine water is a red-brown colour and is decolourised by unsaturated hydrocarbons. The Bromine water test is a standard test for unsaturation



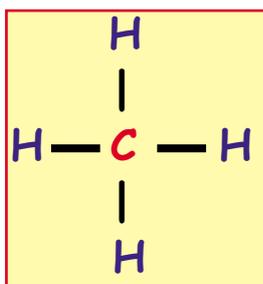
**14.** The Bromine water test is used to detect which one of the following?

- A** - Saturated hydrocarbons
- B** - Double bonds
- C** - Carbohydrates
- D** - Hydrogen carbonate

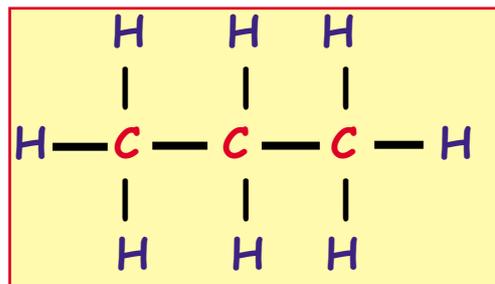


## ● Bromine water test

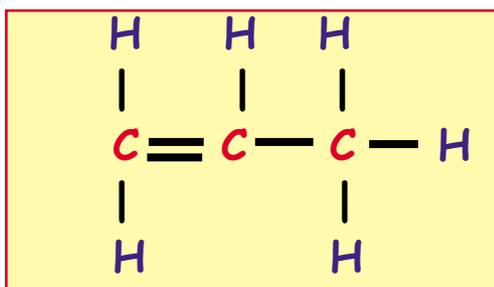
15. Which one of the following compounds would decolourise Bromine water?



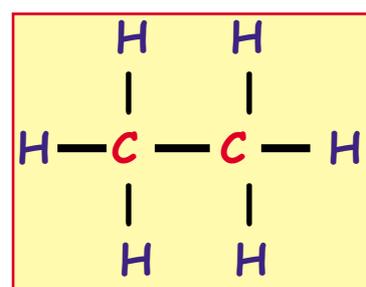
Compound 1



Compound 2



Compound 3



Compound 4

**A** - Compound 3

**B** - Compound 2

**C** - Compound 1

**D** - Compound 4



## ● Bromine water test

16. Which one of the following is an example of an unsaturated hydrocarbon?

A -  $C_4H_{10}$

B -  $CH_4$

C -  $C_2H_6$

D -  $C_2H_4$

17. Which one of the following would decolourise Bromine water?

A - Ethene.

B - Ethane

C - Methane

D - Propane

18. Alkanes have the general formula  $C_nH_{2n+2}$ . Which one of the following is the correct formula for propane where  $n = 3$ ?

A -  $C_6H_{10}$

B -  $C_3H_8$

C -  $C_3H_6$

D -  $C_2H_6$

19. Alkenes have the general formula  $C_nH_{2n}$ . Which one of the following is an alkene?

A -  $C_6H_{14}$

B -  $C_2H_6$

C -  $C_2H_4$

D -  $C_7H_{16}$

- Fractional Distillation
- Cracking
- Bromine water test

**SECTION TOTAL**

**SECTION PERCENTAGE**