

**CHEMISTRY****0620/11**

Paper 1 Multiple Choice (Core)

**May/June 2018****45 minutes**

Additional Materials: Multiple Choice Answer Sheet  
Soft clean eraser  
Soft pencil (type B or HB is recommended)

**READ THESE INSTRUCTIONS FIRST**

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

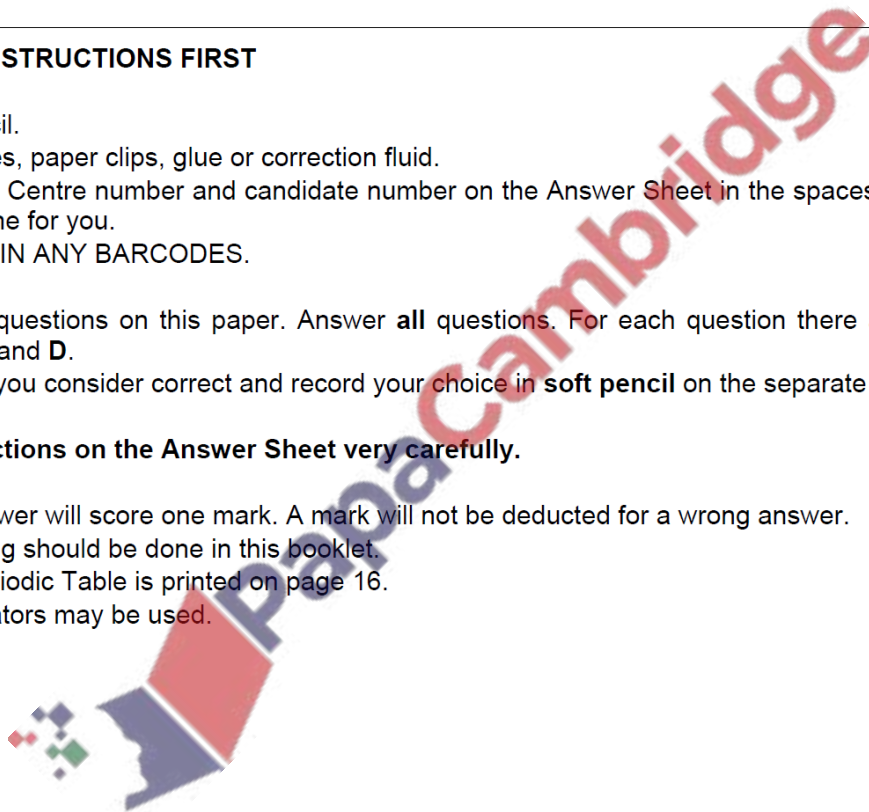
**Read the instructions on the Answer Sheet very carefully.**

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

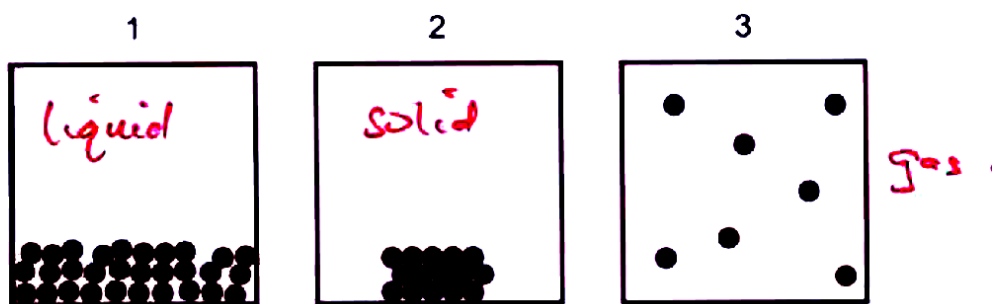
A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.



1.

The diagrams show particles in a container.

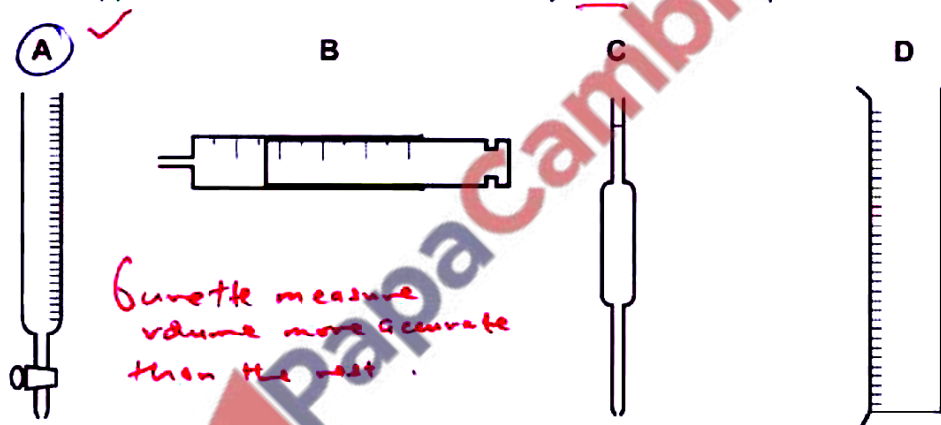


Which two diagrams show the process of evaporation? ← liquid to gas.

- A 1 → 2      B 1 → 3      C 2 → 3      D 3 → 1

2.

Which piece of apparatus is used to measure exactly 26.3 cm<sup>3</sup> of a liquid?



3.

The melting points and boiling points of pure substances W, X and Y are shown.

	W	X	Y
melting point/°C	-114	115	-101
boiling point/°C	78	445	-34

The substances are chlorine, ethanol and sulfur.

Which row identifies W, X and Y?

	W	X	Y
A ✓	chlorine	ethanol	sulfur
B	ethanol	sulfur	chlorine
C	sulfur	chlorine	ethanol
D	sulfur	ethanol	chlorine

4.

In which atom is the number of protons equal to the number of neutrons?



$$40 - 18 = 22$$

22 - neutrons  
18 - protons



$$19 - 9 = 10$$

10 - neutrons  
9 - protons



$$23 - 11 = 12$$

12 - neutrons  
11 - protons



$$16 - 8 = 8$$

8 - neutrons  
8 - protons

5.

Which row identifies an alloy, a pure metal and a non-metal?

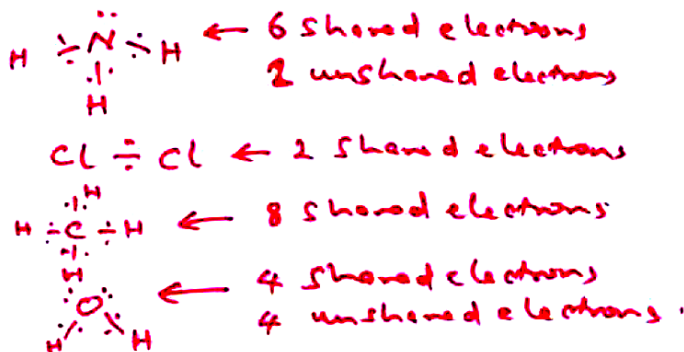
	alloy	pure metal	non-metal
A ✓	brass ✓	carbon ✗	copper ✗
B	brass ✓	copper ✓	carbon ✓
C	copper ✗	brass ✗	carbon ✓
D	copper ✗	carbon ✗	brass ✗

6.

A covalent molecule Q contains exactly six shared electrons.

What is Q?

- A ammonia,  $\text{NH}_3$   
 B chlorine,  $\text{Cl}_2$   
 C methane,  $\text{CH}_4$   
 D water,  $\text{H}_2\text{O}$



7.

The 'lead' in a pencil is made of a mixture of graphite and clay.



When the percentage of graphite is increased, the pencil slides across the paper more easily.

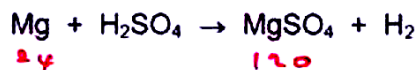
Which statement explains this observation?

- A Graphite has a high melting point.  
 B Graphite is a form of carbon.  
 C Graphite is a lubricant.  
 D Graphite is a non-metal.

8.

The equation for the reaction between magnesium and dilute sulfuric acid is shown.

The  $M_r$  of  $\text{MgSO}_4$  is 120.



$A_r \text{ of Mg} = 24$   
 $24\text{g} \rightarrow 120\text{g}$   
 $12\text{g} \rightarrow 60\text{g}$

Which mass of magnesium sulfate is formed when 12g of magnesium completely reacts with dilute sulfuric acid?

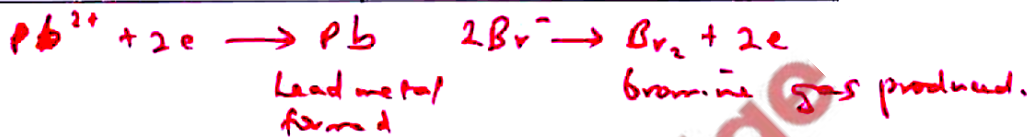
- A 5g       B 10g       C 60g       D 120g

9.

What is observed at each electrode when molten lead(II) bromide is electrolysed using platinum electrodes?

	negative electrode	positive electrode
A	bubbles of a colourless gas	bubbles of a brown gas
B	bubbles of a colourless gas	bubbles of a colourless gas
<b>C</b>	shiny grey liquid ✓	bubbles of a brown gas ✓
D	shiny grey liquid	bubbles of a colourless gas

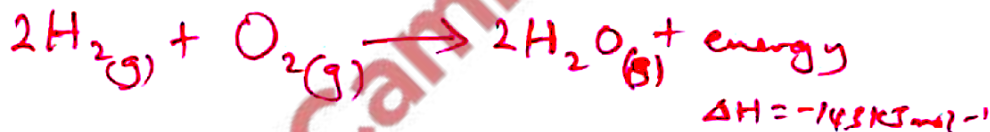
cathode: anode  
 $Pb^{2+}$   $Br^-$



10.

Which gas is used as a fuel?

- A ✓ argon  
**B** hydrogen  
 C nitrogen  
 D oxygen



11.

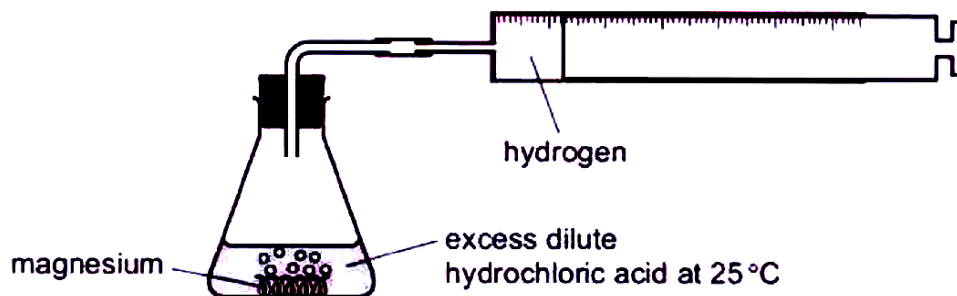
Burning fuels is an exothermic reaction.

What is meant by the term exothermic?

- A ✓ A gas is produced.  
**B** Energy is released.  
 C Heat is absorbed.  
 D The mass of the fuel decreases.

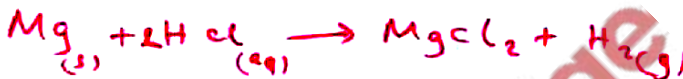
12.

The diagram shows a rate of reaction experiment.



Increasing the concentration of the acid and increasing the temperature both affect the rate of reaction.

Which row is correct?



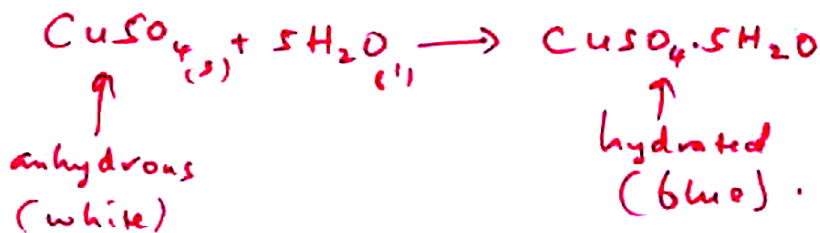
	increase the concentration of acid	increase the temperature
<b>A</b>	decrease rate of reaction	decrease rate of reaction
<b>B</b>	decrease rate of reaction	increase rate of reaction
<b>C</b>	increase rate of reaction	decrease rate of reaction
<b>D</b>	increase rate of reaction	increase rate of reaction

13.

Water is added to anhydrous copper(II) sulfate.

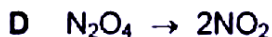
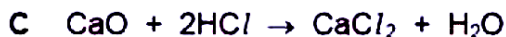
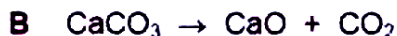
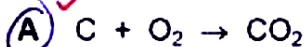
What happens during the reaction?

- A** The copper(II) sulfate turns blue and the solution formed gets colder.
- B** The copper(II) sulfate turns blue and the solution formed gets hotter.
- C** The copper(II) sulfate turns white and the solution formed gets colder.
- D** The copper(II) sulfate turns white and the solution formed gets hotter.



14.

Which equation shows an oxidation reaction?



oxidation is addition of oxygen

15.

Dilute nitric acid is added to a solid, F.

A gas, G, is produced which is denser than air and extinguishes a burning splint.

What are F and G?

acid + carbonates  $\Rightarrow$  salt +  $H_2O$  +  $CO_2$ .

	solid F	gas G
<input checked="" type="radio"/> A	calcium	hydrogen
<input checked="" type="radio"/> B	calcium carbonate	carbon dioxide
<input type="radio"/> C	calcium hydroxide	hydrogen
<input type="radio"/> D	calcium oxide	carbon dioxide

$CO_2$  is heavier than air  
 $SO_2$   
 $HCl$

16.

Which statement about oxides is correct?

A A solution of magnesium oxide has a pH less than pH 7.  $\leftarrow$  solution is basic so  $pH > 7$

B A solution of sulfur dioxide has a pH greater than pH 7.  $\leftarrow$  solution is acidic so  $pH < 7$

C Magnesium oxide reacts with nitric acid to make a salt.

D Sulfur dioxide reacts with hydrochloric acid to make a salt. x

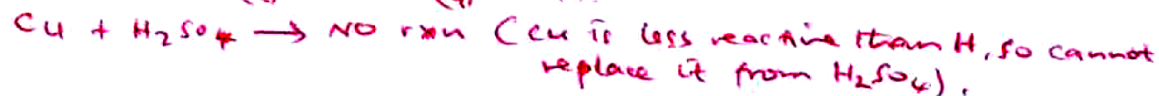
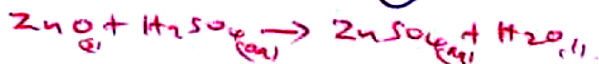
-  $SO_2(g)$  is acidic gas

- so acid + acid cannot produce a salt.

17.

Which methods are suitable for preparing both zinc sulfate and copper(II) sulfate?

- 1 reacting the metal oxide with warm dilute aqueous sulfuric acid ✓
- 2 reacting the metal with dilute aqueous sulfuric acid
- 3 reacting the metal carbonate with dilute aqueous sulfuric acid

A 1, 2 and 3    B 1 and 2 only    **C 1 and 3 only** ✓    D 2 and 3 only

18.

Two salt solutions, X and Y, are tested.

The table shows the results.

test	X	Y
a few drops of aqueous sodium hydroxide are added	green precipitate formed	red-brown precipitate formed
a few drops of dilute nitric acid and a few drops of barium nitrate are added	no change seen	white precipitate formed
a few drops of dilute nitric acid and a few drops of silver nitrate are added	white precipitate formed	no change seen

What are X and Y?

	X	Y
<b>A</b> ✓	iron(II) chloride	iron(III) sulfate
B	iron(III) chloride	iron(III) sulfate
C	iron(II) sulfate	iron(III) chloride
D	iron(III) sulfate	iron(III) chloride

In NaOH(aq)

- Fe<sup>2+</sup> form green ppt.
- Fe<sup>3+</sup> forms red-brown ppt

$$2\text{AgNO}_3 + \text{FeCl}_2 \rightarrow 2\text{AgCl} + \text{Fe(NO}_3)_2$$

↑  
white ppt -

- FeSO<sub>4</sub> is soluble.

19.

Which element is in the same period of the Periodic Table as silicon?

- A germanium
- B scandium
- C sodium** ✓
- D strontium

Same period - means same row.

20.

Which statement about the halogens is correct?

- A A sample of bromine reacts with potassium chloride solution.
- B** A sample of bromine reacts with potassium iodide solution.
- C A sample of chlorine has a higher density than a sample of bromine.
- D A sample of chlorine is a darker colour than a sample of bromine.

21.

Which row shows the catalytic activity of transition elements and their compounds?

	catalytic activity of transition elements	catalytic activity of compounds of transition elements
<b>A</b>	good	good
B	good	poor
C	poor	good
D	poor	poor

22.

Which statement about the noble gases is not correct?

- A** Noble gases are diatomic molecules.
- B Noble gases are unreactive gases.
- C Noble gases have full outer electron shells.
- D The noble gas argon is used in lamps.

23.

The following statements are made about the metals copper, iron, magnesium and zinc.

- ✗ 1 Their oxides are acidic. ← Oxides (eg CuO, FeO) are basic.
- ✓ 2 They all conduct electricity in the solid state.
- ✓ 3 They all have high melting points.
- ✗ 4 They all react with dilute acids to form hydrogen. ← copper does not react with dilute acids.

Which statements are correct?

A 1 and 2

B 1 and 4

**C** 2 and 3

D 3 and 4

24.

Three metals, X, Y and Z, were reacted with water.

The oxides of the same three metals were also heated strongly with carbon.

The results are shown.

metal	reaction of the metal with water	reaction of the metal oxide with carbon
X	vigorous reaction with cold water	no reaction
Y	no reaction	metal and carbon dioxide produced
Z	no reaction observed with cold water but reaction observed with steam	no reaction

What is a correct conclusion about X, Y and Z?

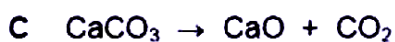
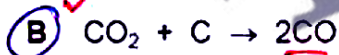
- A X is sodium and Y is magnesium.
- B X is the least reactive and Y is the most reactive.
- C Z is less reactive than Y.
- D Z is magnesium and Y is copper.

25.

In a blast furnace, iron ore is mixed with coke and limestone, and heated in hot air.

Compound R is formed. Compound R then reduces the iron ore to iron.

Which equation shows the formation of compound R?



Compound R is  $CO$

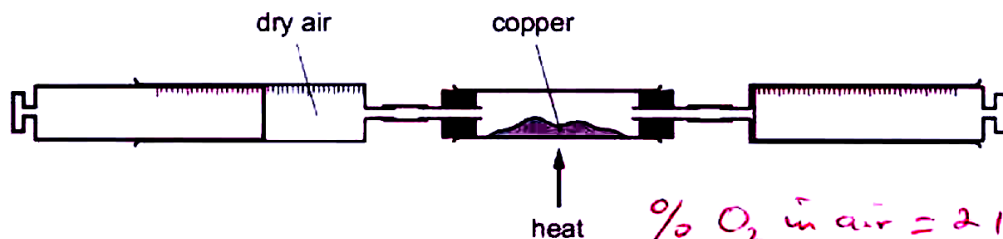
26.

Which statement explains why aluminium is used in the manufacture of aircraft?

- A It conducts heat well.
- B It has a low density.
- C It is a good conductor of electricity.
- D It is easy to recycle.

27.

Dry air is passed over hot copper until all the oxygen has reacted.



The volume of gas at the end of the reaction is  $120 \text{ cm}^3$ .

What is the starting volume of dry air?

- A  $132 \text{ cm}^3$     B  $152 \text{ cm}^3$     C  $180 \text{ cm}^3$     D  $570 \text{ cm}^3$

$\% \text{ O}_2 \text{ in air} = 21\%$

$\therefore 120 \text{ cm}^3 = 79\%$

$? = 100\%$

$\frac{120 \text{ cm}^3 \times 100}{79} = 151.8$

28.

A steel bicycle which had been left outdoors for several months was starting to rust.

What would not reduce the rate of corrosion?

- A Remove the rust and paint the bicycle.  
 B Remove the rust and store the bicycle in a dry shed.  
 C Remove the rust and wipe the bicycle with a clean, damp cloth.  
 D Remove the rust and wipe the bicycle with an oily cloth.

Rusting requires  
 - oxygen  
 - moisture

To prevent rust  
 - paint  
 - grease  
 - galvanise

29.

Which statements about water are correct?

- 1 Household water contains dissolved salts. ✓
- 2 Water for household use is filtered to remove soluble impurities. ✗
- 3 Water is treated with chlorine to kill bacteria. ✓
- 4 Water is used in industry for cooling. ✓

- A 1, 2, 3 and 4  
 B 1, 2 and 3 only  
 C 1, 3 and 4 only  
 D 2, 3 and 4 only

30.

Farmers use fertilisers to replace minerals in the soil that have been removed by the crops they grow.

Which elements in the soil are replaced by adding fertilisers?

- A Ca, P, O    B K, O, S    C N, K, P    D N, O, S

- nitrogen (N)  
 - potassium (K)  
 - phosphorus (P)

31.

Which statement is correct?

- A Atmospheric carbon dioxide is not a cause of climate change.
- B Atmospheric methane is produced by respiration.
- C Burning natural gas decreases the level of carbon dioxide in the atmosphere.
- D Decomposition of vegetation causes an increase in atmospheric methane.

32.

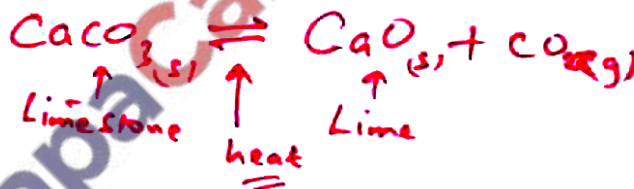
Which statement about sulfur and its compounds is not correct?

- A Sulfur dioxide is used as a food preservative. ✓
- B Sulfur dioxide turns acidified aqueous potassium manganate(VII) from purple to colourless. ✓
- C Sulfur forms a basic oxide. ✗ ← forms acidic oxide, since it's a non-metal
- D Sulfur is used in the manufacture of sulfuric acid. ✓

33.

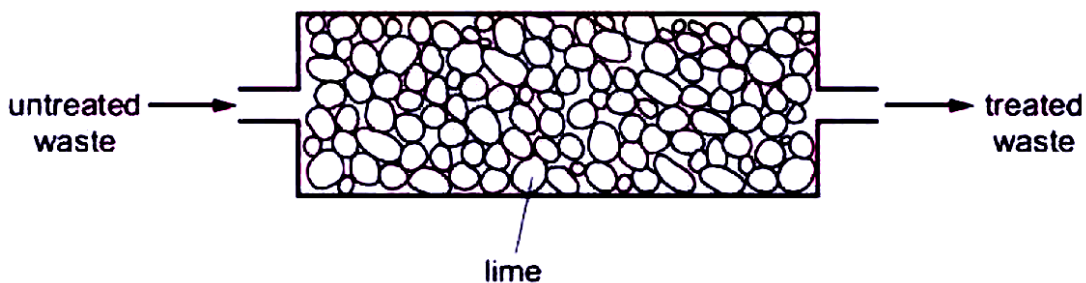
Which process is used to convert limestone (calcium carbonate) into lime?

- A electrolysis
- B fractional distillation
- C incomplete combustion
- D thermal decomposition



34.

Lime is used to treat an industrial waste.



Which change occurs in the treatment?



↑  
neutralisation.

	untreated waste		treated waste
<b>A</b>	acidic	→	neutral
<b>B</b>	alkaline	→	acidic
<b>C</b>	alkaline	→	neutral
<b>D</b>	neutral	→	acidic

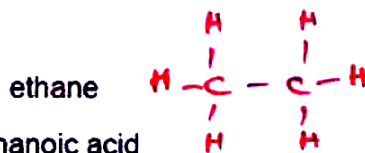
35.

What is not the correct use of the fraction named?

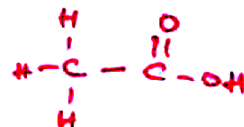
	name of fraction	use
<b>A</b>	fuel oil	making waxes ✗
<b>B</b>	gas oil	fuel in diesel engines ✓
<b>C</b>	kerosene	jet fuel ✓
<b>D</b>	naphtha	making chemicals ✓

36.

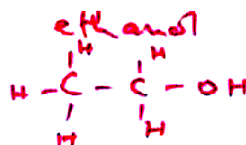
Four organic compounds are listed.



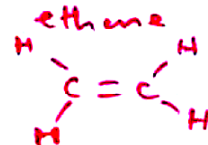
ethanoic acid



ethanol



ethene



Common bond is C-H

Which bond do all four compounds contain?

A C-C

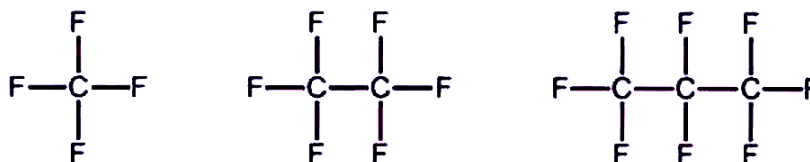
**B** C-H

C C-O

D O-H

37.

The first three members of a homologous series are shown.



Why do these molecules represent a homologous series?

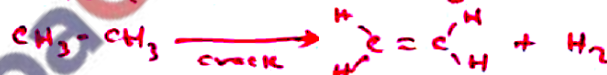
- A because they contain fluorine and carbon atoms  
 B because they have saturated bonds  
 C because they have the same functional group  
 D because they react differently from each other

38.

Which substances can be obtained by cracking hydrocarbons?

- A ethanol and ethene  
 B ethanol and hydrogen  
 C ethene and hydrogen  
 D ethene and poly(ethene)

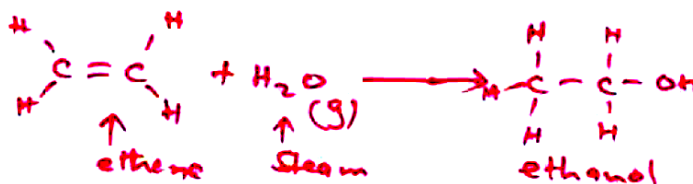
Cracking is breaking down of large less useful organic molecule to a smaller more useful molecule by heat and a catalyst.



39.

Which reaction is used to make ethanol?

- A adding steam to ethene  
 B addition polymerisation  
 C fractional distillation of petroleum  
 D reacting ethene with aqueous bromine



40.

Polymers are long-chain molecules made from small molecules linked together.

Four polymers or types of polymer are listed.

- 1 carbohydrates
- 2 nylon ✓
- 3 proteins
- 4 *Terylene* ✓

Which of these polymers or types of polymer are synthetic?

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

