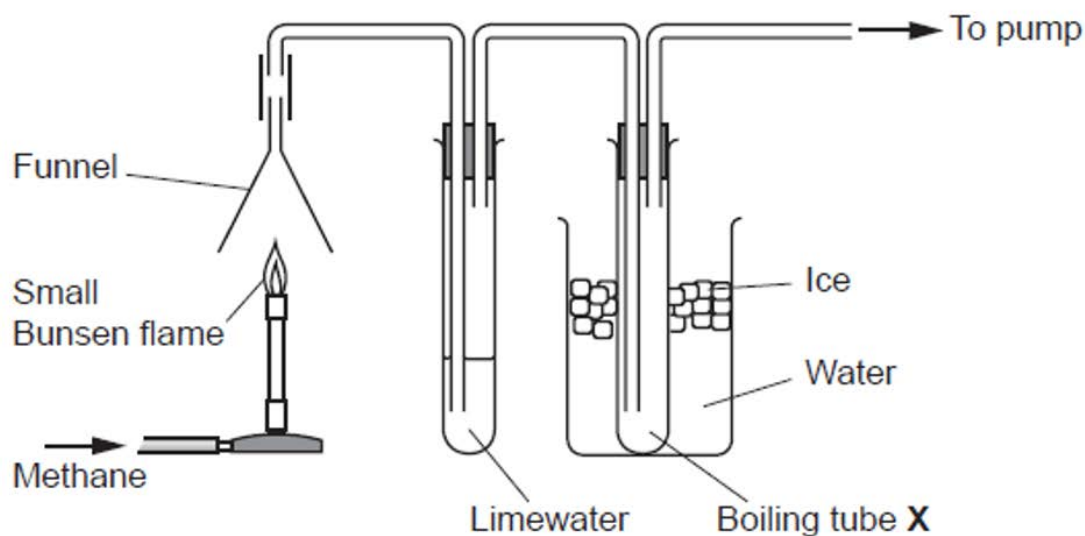


GCSE Chemistry A (Gateway Science)
J248/04 Chemistry A C4-C6 and C7 (Higher Tier)

Question Set 9

- 1 A student did an experiment to prove that methane gas, CH_4 , produces carbon dioxide and water when it burns.

Look at the diagram of her experiment.



- (a) The limewater turned milky showing that carbon dioxide had been formed.

A small amount of a colourless liquid condensed in boiling tube X. The student said that this proved that burning methane produced water.

The teacher said that the experiment had been set up incorrectly.

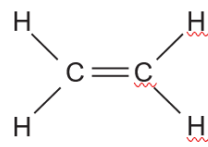
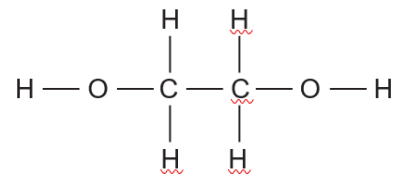
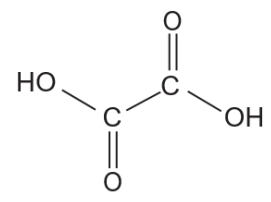
The teacher said that the student's conclusion about water was not valid.

Describe and explain how the student could change how the experiment is set up to prove that water is produced by burning methane.

[2]

- directly connect a tube from funnel to boiling tube X, in water & ice in a beaker
- add anhydrous copper(II) sulfate in X
- if water produced, then it would change colour from white to blue

(b) Look at the monomers shown in the table.

Monomer	Structure
Ethene	
Ethane-1,2-diol	
<u>Ethanedioic acid</u>	

Two of the monomers from the table react to form a polymer which is a **polyester**.

Explain, using the appropriate monomers from the table, how the polyester is formed.

Include the **type of polymerisation** and an **equation for the reaction** in your answer. [4]

ethanedioic acid + ethane-1,2-diol \rightarrow polyester + water
condensation polymerisation
ethane-1,2-diol and ethanedioic acid react to form a polymer and a water molecule. making ester bands in between

(c) DNA and proteins are biological polymers.

(i) How many **different** monomers are found in a DNA polymer? 4 [1]

(ii) What are the monomers in **proteins** called? each base make a different nucleotide
amino acids [1]

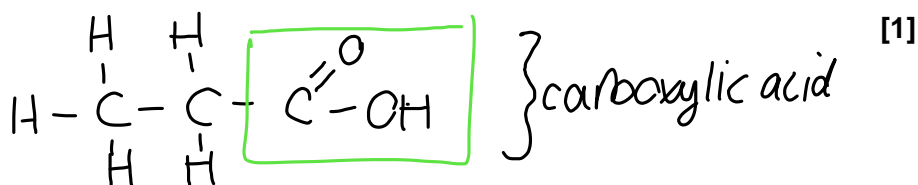
(d) An alcohol, **X**, has the formula C_3H_7OH .

Alcohol **X** can be oxidised to a compound, **Y**, with the molecular formula $C_3H_6O_2$.

(i) Compound **Y** is **not** an alcohol but is a member of another homologous series.

Write down the name of this homologous series.

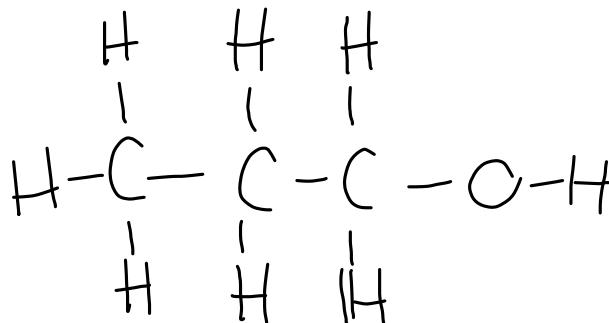
compound Y



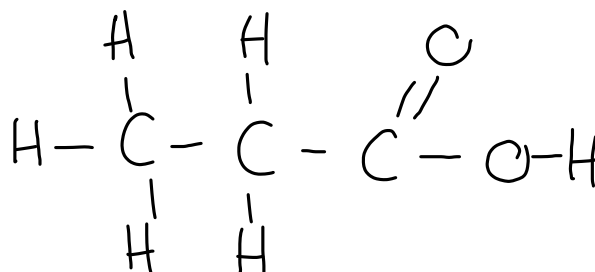
(ii) Draw the **displayed formula** of a molecule of alcohol **X** and of a molecule of compound **Y**.

Show all the covalent bonds.

Alcohol **X**



Compound **Y**



Total Marks for Question Set 9: 11

Resource Materials

The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(0)
1 H hydrogen 1.0	2 He helium 4.0						
3 Li lithium 6.9	4 Be beryllium 9.0	5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3	13 Al aluminium 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1
55 Cs caesium 132.9	56 Ba barium 137.3	57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium
						109 Mt meitnerium	110 Ds darmstadtium
						111 Rg roentgenium	112 Cn copernicium
						113 Nh nihonium	114 Fl flerovium
						115 Mc moscovium	116 Lv livermorium
						117 Ts tennessine	118 Og oganeson

Key
atomic number
Symbol
name
relative atomic mass

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