Organic chemistry II

Question Paper 1

School	Miritini Secondary School
Student's Name	
Level	KCSE
Subject	Chemistry
Topic	Organic chemistry II

Time allowed: 1Hour 20 min

Marks scored: _____ / 60

1. (a) Write down the formula for ethanol and draw its structural formula. [1]

(b) Ethanol is produced by fermentation of sugar solutions.

(i) Name the other product of fermentation. [1]

_____

(ii) Give two other condition which are necessary before fermentation takes place. [2]

_____

_____

(iii) How can dilute solution of ethanol produced by fermentation be concentrated? [1]

_____

_____

_____

(iv) State two uses of ethanol. [2]

_____

_____

_____

_____

2. Write the structural formula of each of the following substances.

(a) C_3H_7OH [1]

(b) CH_3COOH [1]

(c) Butanoic acid [1]

(d) Hexan-1-ol [1]

3. The boiling point of the first six alkanols are given in the following table.

Number of carbon atoms	1	2	3	4	5	6
Boiling points (^0C)	64	78	97	117	132	154

(a) What conclusion can be drawn from the information given in the table above? [1]

_____

_____

_____

(b) The boiling points of the **first six alkanes** are much lower compared to those of alkanols of same number of carbon atoms given in the table above. Explain. [1]

_____

_____

_____

_____

4. Two alkanols X and Y have the same composition by mass: carbon 60%, hydrogen 13.3% and the rest is oxygen. Their relative molecular mass is 60.

(a) Determine the empirical formula and the molecular formula of compound **X** and **Y**. [3]

_____

_____

_____

_____

_____

_____

_____

(b) Write the structural formula for the two isomers. [4]

(c) Name the two isomers. [2]

_____

_____

_____

5. (a) Which organic acid and alkanols could be used to make

(i) Ethyl methanoate

Acid _____ [½]

Alkanol _____ [½]

(ii) Methyl butanoate.

Acid _____ [½]

Alkanol _____ [½]

(b) What is the general name for substances named (i) and (ii) above? [1]

_____

(c) Write the chemical equations for (a) (i) and (ii) above to show how they are formed. [4]

_____

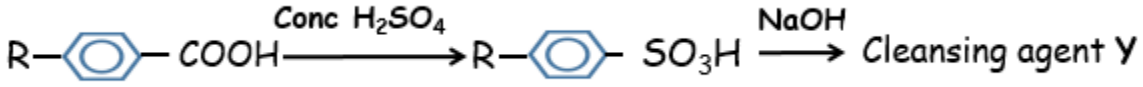
_____

_____

_____

_____

6. The following scheme represents the manufacture of a cleaning agent Y.



(a) Draw the structure of **Y** and state the type of cleaning agent to which **Y** belongs.

Structure [1]

Type of cleaning agent [1]

_____

(b) State one disadvantage and one advantage of using Y as a cleansing agent. [2]

_____

_____

_____

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_____

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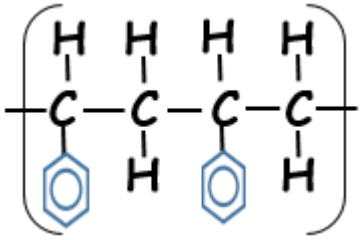
7. The following formula represents a portion of a polymer.



(a) What is the name of the polymer? [1]

_____

(b) Give one disadvantage of continued use of the polymer. [1]

_____

_____

_____

8. Give the names of the following compounds.

(a) $CH_3CH_2CH_2CH_2CH_2OH$ [1]

_____

(b) $CH_3CH_2CH_2CH_2COOH$ [1]

_____

(c) $CH_3CH_2CH_2CH_2OOCCH_3$ [1]

_____

9. During the manufacture of tyre, raw rubber is heated with Sulphur, carbon, phosphorus and manganese.

(a) What name is given to this process? [1]

_____

(b) Explain why the process is necessary. [1]

_____

_____

10. In an experiment, a student placed a small sample of methanoic acid in a beaker. A small amount of sodium carbonate was added to the acid.

(i) State what was observed when sodium carbonate was added to the acid. [1]

_____

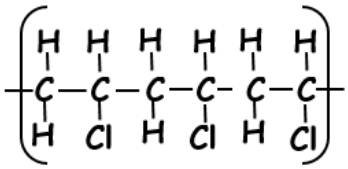
_____

(ii) Write an equation for the reaction. [1]

_____

_____

11. A section of this polymer has the following structure;



A sample of this polymer is found to have a **molecular mass of 70**.

(a) Identify the monomer and draw its structure. [1]

(b) Determine the relative molecular mass of the monomer. [1]

_____

_____

_____

(c) Determine the number of monomers in the sample. [1]

_____

12. There is a similarity between the reaction of ethanol with sodium metal, and the reaction of water with sodium.

(a) What is this similarity? [1]

_____

_____

(b) Write chemical equations to show the similarity. [2]

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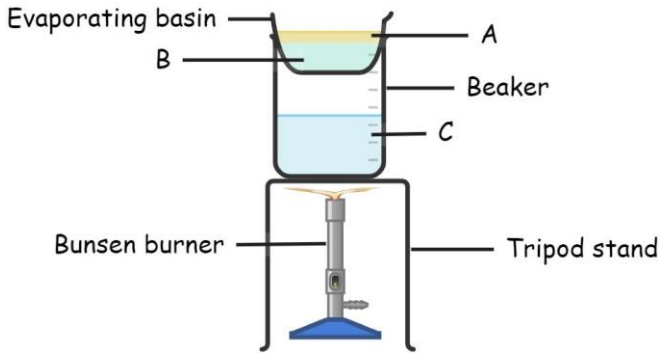
13. The diagram below shows the set-up for the laboratory preparation of soap. Study it and then answer the questions that follow.



(a) Identify substance **A**, **B** and **C**.

A _____ [1]

B _____ [1]

C _____ [1]

(b) A saturated solution of sodium chloride is finally added to the product in the evaporating basin. Explain the purpose of this. [1]

_____

_____

_____

(c) What is name given to the whole process of preparing soap? [1]

_____

14. There is hydrogen bonding between molecules of ethanol. Explain why:

(a) Hydrogen bonding is possible. [1]

_____

_____

(b) Ethanol dissolves in water. [1]

_____

_____

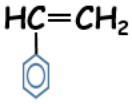
(c) The boiling point of ethanol is higher than that of ethane. [1]

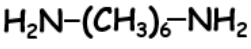
_____

_____

_____

15. Draw the structure of the polymer formed from the following monomers: [4]

(a) 

(b)  and