CHEMISTRY DEPARTMENT 2023
S.6 BRAINSTORMING TEST
TOPIC; APPLIED ORGANIC CHEMISTRY

NAME……**INDEX number**…….
Signature …… **expected score(%)**…….
Instructions; Attempt *all questions in this paper.*

1. (a)Soap can be prepared from a vegetable oil or animal fat.
   (i) Distinguish between a vegetable oil and animal fat (02marks)

……
……
……

(ii) Briefly plain how vegetable oil can be extracted from a named natural source. (03marks)

……
……
……
……
……
……

(b) (i) Briefly describe how soap can be prepared from vegetable oil. (3½mks)

……

……

……

……

……

KIBUGO

(ii) Write equation for the reaction leading to the formation of soap. (01mk)

……

……

(iii) State one advantage and one disadvantage of using soap. (01mark)

Advantage

……

Disadvantage

……

c) (i) Briefly explain the cleansing action of soap. (2½marks)

……

……

……

……

……

(ii) Explain why an aqueous solution of soap is alkaline. (02marks)

……

……

……

……

(c) Soap was prepared from **19.0g** of an oil mainly containing hexadecanoic acid, $CH_3(CH_2)_4COOH$, as the main component. Calculate the mass of soap formed. (03marks)

……

……

……

……

(d) (i) Distinguish between soap and non- soapy detergent ,stating an example of each. (02marks)

……

……

……

……

(ii) Starting from duodecan- 1- ol write equations to show how you would prepare a detergent. (02marks)

……

……

……

(e) State the role of each of the following in manufacture of detergents

(i) Sodium sulphate

……

(ii) Sodium triphosphate

……

(iii) Sodium peroxoborate

……

2. a) Define the term **polymerisation.** (01mark)

……

……

(b) (i) Differentiate between a **natural polymer** and a **synthetic polymer**. (03 marks)

……

……

……

(ii) Differentiate between a **natural polymer** and a **synthetic polymer**.

……

……

(c) Give two examples of an addition polymer and a condensation polymer. (02 marks)

Addition polymer

……

Condensation polymer

……

(d) What are **thermosetting plastics** and **thermoplastics?** (02 marks)

……

……

……

Give one example of each. (02 marks)

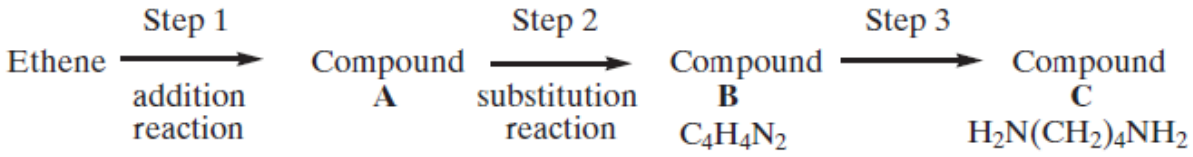
Thermosetting plastics

……

Thermoplastics

……

3. a) Compound **C**, $H_2N(CH_2)_4NH_2$, can be synthesised from ethene in three steps as shown below.



(i) Name compound **C** and draw a structure for each of compounds **A** and **B**. (2 marks)

……

……

(ii) State the reagent(s) required for each step and name the type of reaction involved in the conversion of **B** into **C**. (3 marks)

……

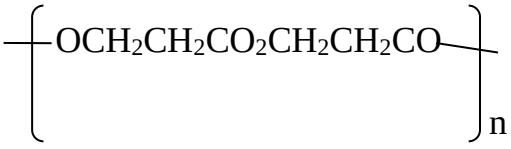
……

……

(b) (i) Draw the repeating unit of the polyamide formed when **C** reacts with hexane-1,6-dioic acid. (01 mark)

……

(c) A polymer has the structure



(i) Write the structure of the monomers (01 mark)

……

(ii) State the type of polymerization reaction leading to the formation of the polymer ($\frac{1}{2}$ mark)

……

(d) When 5×10^{-3} moles of this polymer was hydrolysed 9.0g of monomer was obtained. Calculate value of n (2 marks)

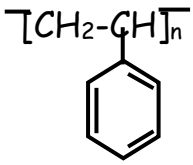
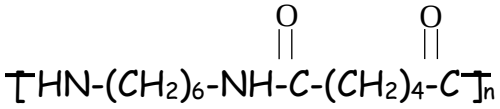
……

……

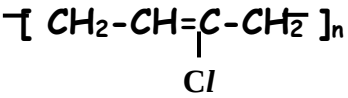
……

……

4. (a) The structural formulae of some polymers are given below. For each polymer, write the structure(s) and names of the monomers used to prepare the polymer. (2½ marks)

Polymer	Structure of monomer	Name of monomer
		
		

(b) A synthetic polymer has a structure



9.89×10^{-2} mole of this polymer was formed when 350 g of the monomer was polymerised. Calculate the

(i) the value of n (2 marks)

.....

.....

.....

(ii) the molar mass of the polymer. (1 mark)

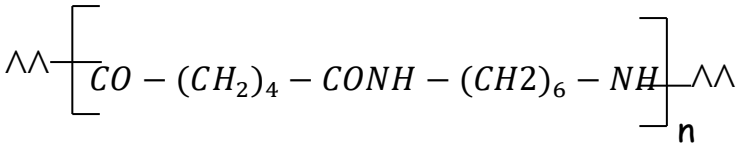
.....

.....

.....

.....

(c) Nylon, 6,6 is a thermosoftening plastic with structure



(i) Write the structure of the monomers. (2 marks)

.....

.....

(ii) Name the reaction for formation of nylon-6, 6 (1 mark)

.....

(d) An aqueous solution containing 1.5% nylon 6,6 was found to exert osmotic pressure of 4.1×10^{-2} atm at 25°C. Calculate

(i) the molar mass of nylon 6,6 (2 ½ marks)

……

……

……

……

(ii) Value of n (1 mark)

……

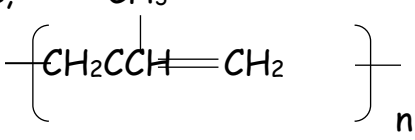
……

……

(e) State one use of nylon 6,6 (½ mark)

……

5. Isoprene,



is a natural polymer formed by addition polymerisation.

a) Write the structural formula and IUPAC name of the monomer in natural rubber. (01 mark)

……

……

b) Natural rubber in its raw form is of little use.

State:

i) the process that is used to make rubber more useful. (½ mark)

……

ii) how the process is carried out. (01mark)

……

iii) how the process improves the properties of natural rubber.

(1½ marks)

……

……

……

END.