Polymer Nomenclature

The naming of polymers is often very difficult, as polymers can have more than one correct name. This is further complicated by product Trade names, such as "Teflon" or "Plexiglass". The method outlined below shows the most clearly and simply method to indicate the chemical structure of the polymer and its name.

Step 1. Identify and name the repeating unit.

Step 2. Determine whether it is a homopolymer or copolymer.

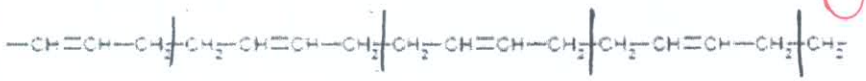
a. If it is a homopolymer place "poly" in front of the name of the repeating unit. For example: –A–A–A–A– is poly(A).

b. If it is a copolymer place "-co-" between the names of the two repeating units and "poly" in front. For example: –A–B–A–B–A– is poly(A-co-B).

Table 1. Some common monomers

Monomer Name	Monomer Structure
Vinyl Chloride	$H_2C{=}CH{-}Cl$
Butadiene	$CH_2{=}CH{-}CH{=}CH_2$
Isobutylene	$CH_3{-}C(CH_3){=}CH_2$
Ethylene or ethene	$CH_2{=}CH_2$
Styrene or ethylbenzene	$H_2C{=}CH{-}C_6H_5$
Propylene	$CH_2{=}CH{-}CH_3$
Acrylonitrile or cyanoethylene	$CH_2{=}CH{-}CN$

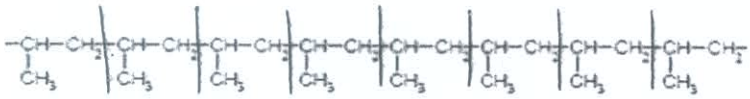
Try naming the following polymers:



a. Circle the repeating unit.

b. Name the monomer(s) Butadiene

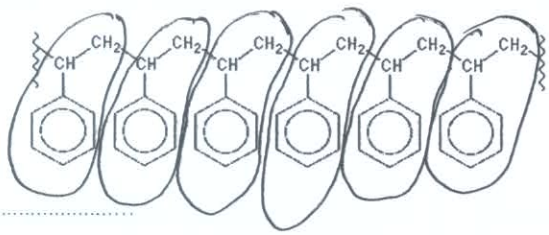
c. Name the polymer Poly (butadiene)



a. Circle the repeating unit.

b. Name the monomer(s) propylene or propene

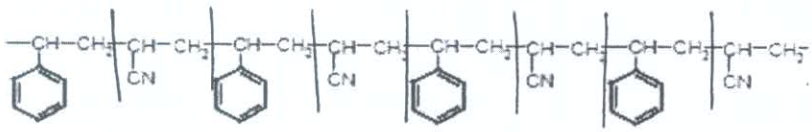
c. Name the polymer poly(propylene) or poly(propene)



a. Circle the repeating unit.

b. Name the monomer(s) Styrene

c. Name the polymer Poly(Styrene)



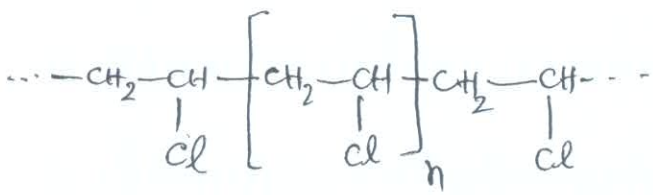
a. Circle the repeating unit.

b. Name the monomer(s) styrene and Acrylonitrile

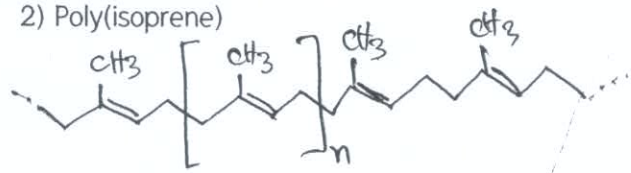
c. Name the polymer Poly(styrene – co – acrylonitrile)

Try drawing the following polymers. You may draw several repeating units or use the shorthand method $-(-A-B-)_n-$.

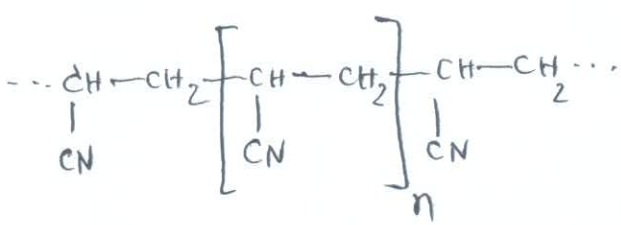
1) Poly(vinyl chloride)



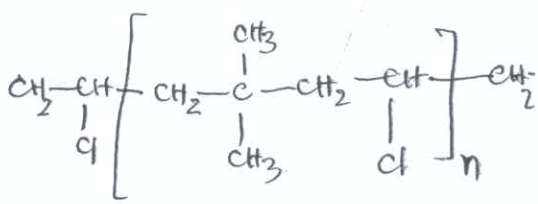
2) Poly(isoprene)



3) Poly(acrylonitrile)



4) poly(vinyl chloride–co–isobutylene)



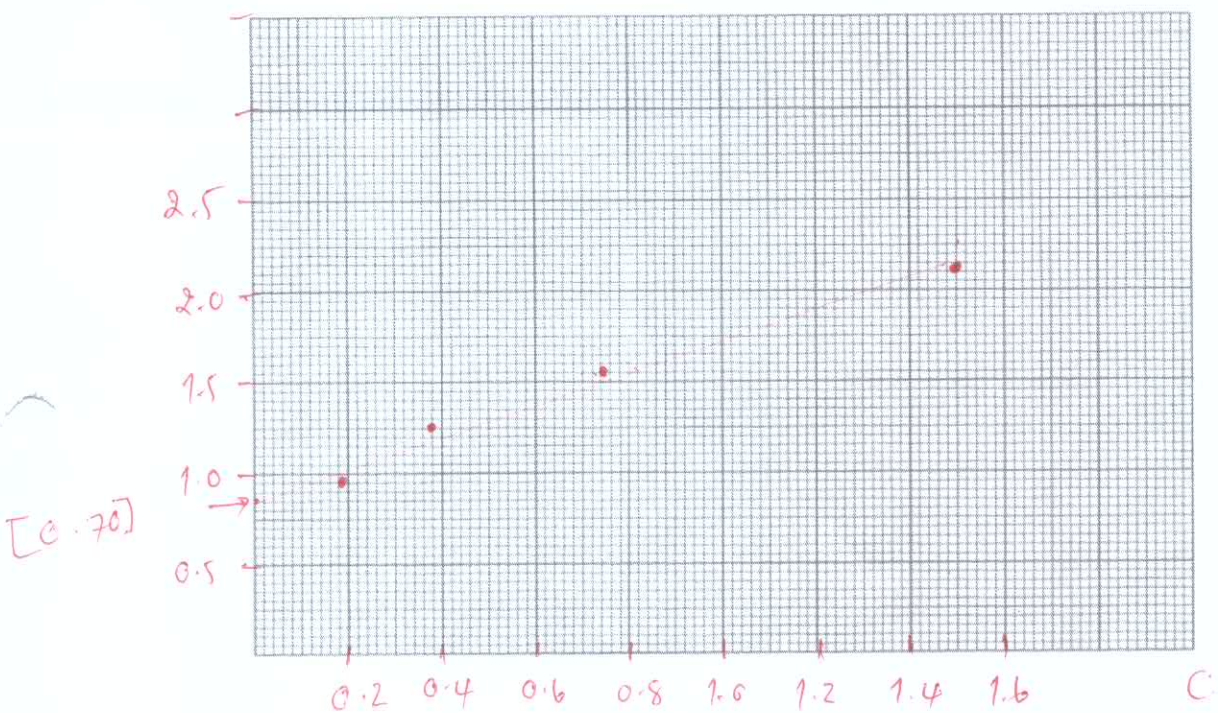
การหามวลโมเลกุลของพอลิไวนิลอัลกอฮอล์โดยการวัดความหนืด

ค่า flow-time ของสารละลายพอลิเมอร์ในน้ำ ที่ความเข้มข้นต่าง ๆ วัดได้ดังตาราง

คำนวณหาค่าความหนืดแบบต่าง ๆ

ความเข้มข้นของพอลิเมอร์ (% w/v)	flow-time (s)	$\eta_r = \frac{t}{t_0}$	$\eta_{sp} = \eta_r - 1$	$\eta_{red} = \frac{\eta_{sp}}{c}$
0	212	-	-	-
0.19	250	1.18	0.18	0.95
0.38	312	1.47	0.47	1.24
0.75	452	2.13	1.13	1.51
1.50	912	4.30	3.30	2.20

เขียนกราฟเพื่อหาค่าความหนืดภายใน (intrinsic viscosity, [η])



คำนวณหามวลโมเลกุลเฉลี่ยโดยความหนืด โดยอาศัยสมการของ Mark-Houwink

กำหนด ค่า $K = 2.0 \times 10^{-4}$ dl.g^{-1}

$a = 0.76$

$[\eta] = K\bar{M}_v^{a}$

$0.70 = (2.0 \times 10^{-4})\bar{M}_v^{0.76}$

$\bar{M}_v^{0.76} = \frac{0.70}{2.0 \times 10^{-4}} = 3.5 \times 10^{3}$

$\log \bar{M}_v^{0.76} = \log (3.5 \times 10^{3})$

$0.76 \log \bar{M}_v = 3.54$

$\log \bar{M}_v = \frac{3.54}{0.76} = 4.66$

$\bar{M}_v = 10^{4.66} = 45708.82$