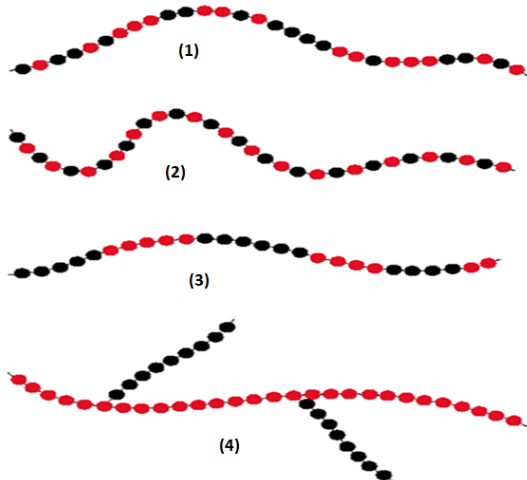


Chem 330 Midterm Exam

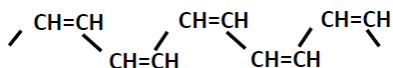
Date 12/10/2022 – Allowed time: 70 min

- Which of the following structures is **(are)** for a polymer?
A) $\text{CH}_3\text{-CH}_2\text{-CH(COOH)-(CH}_2\text{-CH}_2\text{-O)}_{23}\text{-CH}_3$
B) $\text{Ph-(CO-CH}_2\text{)}_n\text{-(C}_6\text{H}_4\text{)}_m\text{-COOH}$
C) $\text{CH}_2\text{=CH-(CH=CH)}_n\text{-CH=CH}_2$
D) $\text{H}_2\text{N-C(CO}_2\text{H)-(CH}_2\text{-CH}_2\text{)}_4\text{-(CH}_2\text{-O)}_3\text{-CHO}$
- What is the nomenclature and the structure of each polymer synthesized from the following monomers?
 - Acrylonitrile ($\text{CH}_2\text{=CH-CN}$)
 - Acrylamide ($\text{CH}_2\text{=CH-CO-NH}_2$)
 - Vinylalcohol ($\text{CH}_2\text{=CH-OH}$)
 - Phenyl acetylene ($\text{HC}\equiv\text{CH-Ph}$)
- What is the nomenclature and the structure of each monomer used in the synthesis of the following polymers?
 - poly(methyl acrylate)
 - Poly(vinylpyridine)
 - Poly(ethylene glycol)
 - Poly(vinylnaphtalene)
- Among the following polymers Indicate those that have a **tacticity**.
 $\text{-[CH}_2\text{-CH(COOH)]}_n\text{-}$; $\text{-[CH}_2\text{-CH(C}_6\text{H}_5\text{)]}_n\text{-}$; $\text{-[CH}_2\text{-CH}_2\text{]}_n\text{-}$; $\text{-[CH}_2\text{-CH}_2\text{-O-]}_n\text{-}$; $\text{-[O-C}_6\text{H}_4\text{-]}_n\text{-}$
- Indicate the name and the formula of
 - a grafted copolymer prepared from styrene and acrylic acid
 - a block copolymer prepared from acrylonitrile and acrylamide

6. Associate with each copolymer one of the four terms: alternative, sequenced, random and grafted.

(1) is (2) is (3) is (4) is	
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7. What is the **isomeric** structure of the following molecule?



8. The maximum degree of crystallinity is found in:
- Poly(vinylpyridine)
 - Polyethylene
 - Poly(methyl methacrylate)
 - Poly(2-hydroxyethylmethacrylate)
9. There are three monomers: M1, M2, and M3; M1 contains one double bond and no functional group, M2 contains one reactive functional group and no double bond, and M3 contains two reactive functional groups and no double bond. Which statement is true?
- All three monomers can be polymerized via addition and condensation polymerization.
 - M1 can be polymerized via addition, M2 cannot be polymerized, and M3 can be polymerized via condensation.
 - M1 can be polymerized via addition, and both M2 and M3 can be polymerized via condensation.
 - None of the monomers are polymerizable.

10. Among the following initiators, which of them can polymerize acrylic acid through **radical** polymerization route.

NaOH; HCl; AlCl₃; Ph-CO-O-O-CO-Ph; Et-ONa; TiCl₄

11. Among the following initiators, which of them can polymerize acrylic acid through **cationic** polymerization route.

NaOH; HCl; AlCl₃; Ph-CO-O-O-CO-Ph; Et-ONa; TiCl₄

12. Among the following initiators, which of them can polymerize propylene through **coordination** polymerization (Ziegler-Natta) route.

NaOH; HCl; AlCl₃; Ph-CO-O-CO-Ph; TiCl₄; TiCl₄/AlCl₃; NaCl/AlCl₃; Et-Na/AlCl₃

13. What are the different steps occurring in a free radical polymerization?

14. The polyaddition occurs on monomers having:

A) Two activated functional groups or more

B) Double bonds

C) Triple bonds

D) All these responses

15. Among the following initiators, which one can be used in the cationic polymerization?

A) NaOH

B) HCl

C) CH₃-CO-OCH₃

D) Ph-CO-O-O-COPh