

HW06 - Plastics & Polymers

1 6 points

Which step of the addition mechanism both increases the length of the polymer chain AND produces a free radical to continue the reaction?

- perpetuation
- propagation
- initiation
- termination
- addition

2 6 points

Which of the following properly outlines the addition mechanism?

- Heterolytic Cleavage - Propagation - Condensation - Termination
- Initiation - Termination - Propagation
- Initiation - Propagation - Condensation - Termination
- Initiation - Propagation - Termination

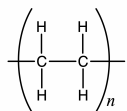
3 6 points

A condensation reaction may occur when which two functional groups are present in the reactants?

- amine, carboxylic acid
- aldehyde, ether
- carboxylic acid, alcohol
- alcohol, ester
- ketone, alcohol

4 6 points

Which recycle symbol (number) would you most likely find on a large milk container made from the following monomer:



- 1
- 2
- 4
- 6
- 5

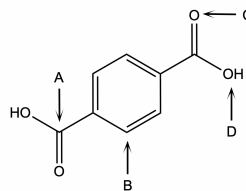
5 6 points

LDPE polymers are _____ branched than HDPE, resulting in greater _____.

- more, strength
- more, flexibility
- less, flexibility
- less, strength

6 6 points

Observe the structure below and answer the next two questions.



Which arrow is pointing to a carbonyl carbon?

- B
- A
- C
- D

7 6 points

On this same structure, which group will be removed in the condensation mechanism?

- D
- A
- B
- C

8 6 points

Fabrics often list their contents in generic terms, rather than proprietary ones. What might you find on the care tag of a nylon garment?

- silk
- polyamide
- Kevlar
- polyester
- polystyrene

9 4 points

Which of the following polymers are made via *an* addition reaction mechanism?

- Polyethylene
- Nylon
- Bakelite
- Polypropylene
- Polystyrene
- Polyethylene Terephthalate
- Polyvinyl Chloride

10 6 points

Five of the six "Big 6" plastics are composed of nearly the same repeating monomer, but with differing functional groups substituted into a single position. What is the functional group unique to polypropylene?

- amine
- halide
- methyl
- carboxyl
- alcohol

11 6 points

Which of the following functional groups is the distinguishing feature of the monomer used to manufacture styrofoam?

- a benzyl group
- an amine group
- a halide group
- a phenyl group
- a ester group

12 6 points

The following three common plastic items are most likely to be composed of which three Big 6 plastics? (identify the plastics by their recycling number)

- Disposable coffee cup
 - Plumbing pipe
 - Carbonated drink bottle
- 2, 4, 6
 - 5, 2, 3
 - 3, 1, 4
 - 6, 3, 1

13 6 points

The bakelite polymer consists of phenol and formaldehyde. In the real world, why does this polymer **not** look as organized as it does in two dimensions?

- the carbon-carbon bonds in the phenol groups can rotate and branch in different directions
- the phenol groups are flat
- the methylene links are flat and rigid
- the methylene links can rotate and branch in different directions

14 6 points

Which of the following is/are made from amino acid monomers?

- fats
- wool
- starch
- cellulose
- silk
- biological proteins

15 6 points

Which of the following can be glucose polymers?

- proteins
- flax
- silk
- cotton
- carbohydrates
- wool

16 6 points

There are many different types of proteins. What makes a protein unique?

- the fact that all amino acids have the same functional groups
- the identity of the R-side chain on the amino acid monomers that make up the polymer
- the various sugar monomers that make up the protein chain
- the carboxylic acid and amine functional groups on the amino acid monomers

17 6 points

Consider the biological polymer of DNA. There are two monomer units (a copolymer) that make up the backbone chain - what is the repeat unit here?

- phosphate + glucose
- phosphate + deoxyribose
- ester + deoxyribose
- peptide link + ribose
- phosphate + deoxyfructose