

Chapter 3:

1. What is homolytic cleavage?
 - a. Bond breaking when the two electrons are pulled apart by two equal, external forces.
 - b. Bond breaking when the two electrons divide equally between the two parting atoms.
 - c. Bond breaking when the two electrons divide unequally between the two parting atoms.
 - d. Bond breaking when the two electrons are pulled apart by only one external force.

Answer: B

2. What type of bonding is involved in hyperconjugation?
 - a. sp^3 bonding.
 - b. π bonding.
 - c. Sigma bonding.
 - d. Sigma, π , and sp^3 bonding.

Answer: C

3. What does the observation of small amounts of ethane in the chlorination of methane reaction imply about the reaction mechanism?
 - a. It implies homolytic bond cleavage on the part of the reactants.
 - b. It implies that there is a methyl radical that can combine with another like itself to form this product.
 - c. It implies that chlorine initiates the reaction.
 - d. It implies that there is not enough chlorine for the reaction to take place.

Answer: B

4. What is the Hammond Postulate?
 - a. That early transition states are often a characteristic of slow, endothermic processes, while late transition states are often characteristic of the reverse.
 - b. That early transition states are often a characteristic of fast, endothermic processes, while late transition states are often characteristic of the reverse.
 - c. That early transition states are often a characteristic of slow, exothermic processes, while late transition states are often characteristic of the reverse.
 - d. That early transition states are often a characteristic of fast, exothermic processes, while late transition states are often characteristic of the reverse.

Answer: D

5. Pyrolysis refers to what type of chemical reaction?
- Cleavage of C-C and C-H bonds at high temperature.
 - Cleavage of C-H bonds to form radicals.
 - Cleavage of C-C bonds to form radicals.
 - Cleavage of C-C and C-H bonds at moderate temperature.

Answer: A

6. Upon what does the relative reactivity of primary, secondary, and tertiary hydrogens depend?
- The temperature of the reaction, with greater selectivity at higher temperature.
 - The relative C-H bond strengths.
 - The relative polarity of the C-H bonds.
 - The relative electronegativity difference of the C-H bond.

Answer: B

7. How is elemental chlorine prepared, for subsequent use in alkane chlorinations?
- From water desalinization.
 - From salt mining.
 - As a by-product from polyvinyl chloride production.
 - From salt electrolysis.

Answer: D

8. How is ozone degradation in the upper atmosphere started?
- By escape of chlorine into the atmosphere.
 - By radical chlorine dissociation from a CFC or CFC-type molecule.
 - By chlorine dissociation from a CFC or CFC-type molecule.
 - By elemental chlorine dissociation from a CFC or CFC-type molecule.

Answer: B

9. What current CFC substitute is considered acceptable for industrial production, and safe for the planetary ozone layer?
- Fluorocarbons.
 - Alkylated carbons.
 - Hydrofluorocarbons.
 - Ozonated fluorocarbons.

Answer: C