



**National Officers Academy**  
**Mock Exams for CSS-2022**  
**April 2022 (Final Mock)**  
**CHEMISTRY, PAPER-II**

**TIME ALLOWED: THREE HOURS**  
**PART-I(MCQS): MAXIMUM 30 MINUTES**

**PART-I (MCQS)**  
**PART-II**

**MAXIMUM MARKS = 20**  
**MAXIMUM MARKS = 80**

**NOTE:**

- i. **Part-II** is to be attempted on the separate **Answer Book**.
- ii. Attempt **ONLY FOUR** questions from **PART-II**. **ALL** questions carry **EQUAL** marks.
- iii. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
- iv. **Use of Calculator is allowed.**

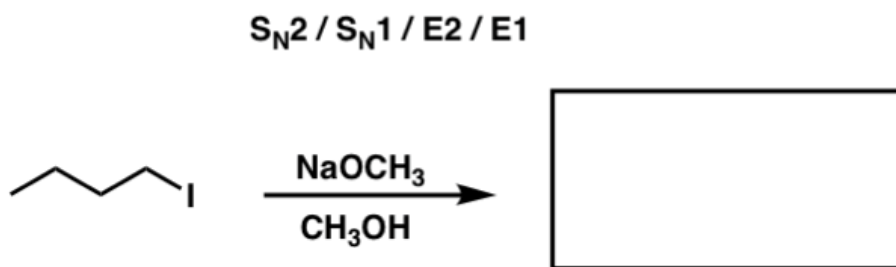
**SUBJECTIVE PART — PART-II**

**Q.2.** Define the following terms. (20)

a) Friedal Craft alkylation b) Friedal Craft acylation (c) Nucleophilic substitution reactions (d) Grignard reagent (e) Aromaticity (f) Hypochromism (g) Markonikov's rule (h) Electrophile (i) carbocation (j) hydrophobicity

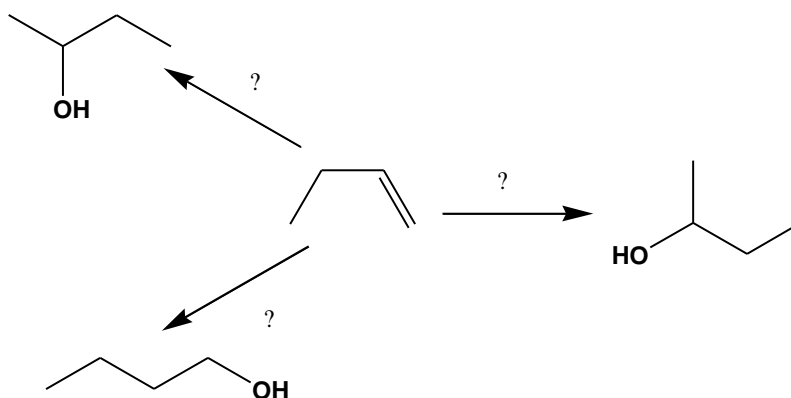
**Q.3. a)** (12)

**Predict the major product** for the following reaction. Label whether the reaction will proceed through an **S<sub>N</sub>2**, **S<sub>N</sub>1**, **E2**, or **E1** mechanism.



b) Discuss esterification in detail. (8)

**Q.4. a)** Mention the reagents for following conversions



b) How ethene can be converted into benzene. (4)

c) Write down esterification mechanism starting with Diazomethane. (10)

Q.5. a)

**Are these molecules enantiomers, diastereomers, or the same?**

**(2*R*, 3*R*)-2-Bromo-3-chlorobutane and (2*S*,3*S*)-2-Bromo-3-chlorobutane**

Q.6. a) Explain stereoisomerism in organic compounds. (10)

b) Draw the structures of the cis-trans isomers for each compound. Label them cis and trans. If no cis-trans isomers exist, write none. (10)

- a. 2-bromo-2-pentene
- b. 3-hexene
- c. 4-methyl-2-pentene
- d. 1,1-dibromo-1-butene
- e. 2-butenic acid ( $\text{CH}_3\text{CH}=\text{CHCOOH}$ )

Q.7. a) Discuss retention of configuration in nucleophilic substitution reactions? (10)

b) Discuss the products formed when toluene is subjected to (10)

a) Nitration b) chlorination c) oxidation d) hydration

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***Best of Luck for CSS-2022***