



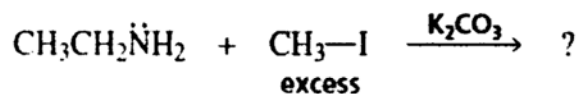
**Q.1. Answer the following short questions: (6x5=30)**

- I. What is Zaitsev's rule? Give one example.
- II. Why aryl halides and vinylic halides do not undergo either S<sub>N</sub>1 or S<sub>N</sub>2 reactions?
- III. How can you explain the fact that rate of S<sub>N</sub>2 reaction involving a negatively charged nucleophile will be greater in an aprotic polar solvent than in a protic polar solvent?
- IV. Would you expect methoxide ion to be a better nucleophile if it were dissolved in methanol or if it were dissolved in dimethyl sulfoxide (DMSO)? Why?
- V. Why do *cis*-1-bromo-2-ethylcyclohexane and *trans*-1-bromo-2-ethylcyclohexane form different major products when they undergo an E2 reaction?
- VI. What is deuterium kinetic isotope effect? Explain with example.

Answer the following questions.

**Question # 2.**

- A. What product is obtained when ethylamine reacts with excess methyl iodide in a basic solution of potassium carbonate? Draw complete mechanisms of all steps involved. [8]



- B. Why NH<sub>3</sub> is better nucleophile than H<sub>2</sub>O? [2]

**Question # 3.**

- A. What is E1cB elimination reaction? Give one example with complete mechanism. [5]  
B. Explain the mechanism and synthetic applications of pyrolytic elimination reactions. [5]

**Question # 4.**

- A. What is neighboring group participation in aliphatic nucleophilic substitution reactions? Give one example with complete mechanism. [5]  
B. CH<sub>3</sub>CH=CHCH<sub>2</sub>Cl on solvolysis with 0.8 M NaOH at room temperature yields two products. With justification identify the major product. (S<sub>N</sub>1' reaction) [5]