Reaction Mechanism Practice

STUDENT PRACTICE WORKSHEET • WORKSPACE PROVIDED

Name: _____ Date: _____

Directions: Select the best answer for each question. Show reasoning on the space provided.

1. 1-Bromobutane is treated with NaI in acetone. Which pathway is favored?

A. SN1

B. SN2

C. E1

D. E2

Reasoning / work:

2. 2-Bromobutane is heated with sodium ethoxide in ethanol. Which pathway is generally favored?

A. SN1

B. SN2

C. E1

D. E2

Reasoning / work:

3. 2-Bromobutane with NaN3 in DMSO: which pathway is generally favored?

A. SN2

B. SN1

C. E1

D. Radical substitution

Reasoning / work:

4. tert-Butyl bromide with potassium tert-butoxide: which pathway is favored?

A. SN2

B. E2

C. Electrophilic addition

D. SN1 only

Reasoning / work:

5. Iodomethane and NaCN in DMSO: expected mechanism?

A. SN1

B. E1

C. SN2

D. E2

Reasoning / work:

6. Which elementary event occurs in a concerted E2 elimination?

A. Leaving group departs before base acts

B. Base removes beta H as leaving group leaves

C. Carbocation rearranges first

D. Nucleophile adds to alkene

Reasoning / work:

7. Which factor most strongly makes SN2 attack on neopentyl bromide unusually slow?

A. Resonance of C–Br bond

B. Beta branching creates steric hindrance

C. Carbocation stability

D. Aromaticity

Reasoning / work:

8. An SN2 reaction follows which idealized rate law?

A. rate = k[RX]

B. rate = k[Nu]

C. rate = k[RX][Nu]

D. rate = $k[RX]^2$

Reasoning / work:

9. For E2 on a cyclohexane chair, which arrangement is normally required?

A. Leaving group equatorial and beta H equatorial

B. Leaving group axial and beta H axial anti

C. Leaving group and beta H on same carbon

D. No beta hydrogen needed

Reasoning / work:

10. Which solvent often favors SN2 relative to the same reaction in a protic solvent?

A. DMSO

B. Water

C. Methanol

D. Ethanol

Reasoning / work:

11. At a stereogenic carbon, an SN2 reaction normally produces which geometric outcome?

A. Retention

B. Inversion

C. Complete racemization

D. No stereochemical change

Reasoning / work:

12. A planar carbocation is formed in an SN1 solvolysis. Which outcome is generally expected?

A. Only inversion

B. Only retention

C. Loss of stereospecificity with both faces available

D. No substitution

Reasoning / work:

13. For alkenes, E/Z labels depend on:

A. Molecular mass only

B. Highest CIP-priority substituent on each alkene carbon

C. Hydrogen count alone

D. Whether the alkene is terminal

Reasoning / work:

14. Two highest-priority groups on an alkene are on opposite sides. It is:

A. E

B. Z

C. R

D. S

Reasoning / work:

15. Two highest-priority groups on an alkene are on the same side. It is:

A. E

B. Z

C. R

D. S

Reasoning / work: