Organic Chemistry Practice Exam A

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

A. SN2

B. E2

C. Electrophilic addition

D. SN1 only

Reasoning / work:

3. 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:

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

A. DMSO

B. Water

C. Methanol

D. Ethanol

Reasoning / work:

5. 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:

6. Which group has higher CIP priority when directly attached to a stereocenter?

A. Carbon

B. Hydrogen

C. Oxygen

D. Nitrogen

Reasoning / work:

7. Which pairing describes enantiomers?

A. Different connectivity

B. Non-superimposable mirror images

C. Same compound in two chair conformations

D. Compounds differing only by a proton

Reasoning / work:

8. A broad IR band spanning roughly 3200–3600 cm−1 often indicates:

A. Alcohol O–H

B. Nitrile C≡N

C. Alkyne C≡C only

D. Carbonyl C=O

Reasoning / work:

9. An aldehydic ^{1}H NMR signal commonly appears near:

A. 0–1 ppm

B. 2–3 ppm

C. 9–10 ppm

D. 14–16 ppm

Reasoning / work:

10. A 6H doublet plus 1H septet can support which fragment?

A. Methoxy group

B. Isopropyl group

C. Ethene

D. Aldehyde

Reasoning / work:

11. Which reagent converts 1-bromobutane to 1-iodobutane most directly?

A. NaI in acetone

B. H2/Pd

C. PCC

D. H2SO4/H2O

Reasoning / work:

12. Which reagent adds HBr across ethene to produce bromoethane?

A. HBr

B. NaBH4

C. NaI in acetone

D. PCC

Reasoning / work:

13. Excess H2/Pd converts 1-butyne into:

A. 1-butene

B. cis-2-butene

C. Butane

D. Butanal

Reasoning / work:

14. Bromoethane reacts with sodium methoxide. The principal substitution product is:

A. Ethene

B. Methoxyethane

C. Ethanol

D. Ethanal

Reasoning / work:

15. PCC oxidation of a simple primary alcohol under anhydrous conditions normally stops at:

A. A ketone

B. An aldehyde

C. An ester

D. An alkene

Reasoning / work:

16. Ketone + Grignard reagent, then H3O+ workup, generally gives:

A. Primary alcohol

B. Secondary alcohol

C. Tertiary alcohol

D. Carboxylic acid

Reasoning / work:

17. An acyl chloride reacting with excess methanol typically yields:

A. An ester

B. An aldehyde

C. A ketone

D. An alkene

Reasoning / work:

18. Lower pKa generally indicates:

A. Stronger acid

B. Weaker acid

C. Stronger base only

D. No connection to acidity

Reasoning / work:

19. What is the degree of unsaturation for C6H6?

A. 2

B. 3

C. 4

D. 5

Reasoning / work:

20. Which molecule has a carbonyl group?

A. Propanone

B. Propane

C. Cyclohexane

D. Ethene

Reasoning / work: