

100 Organic Chemistry Reaction Practice Problems (with Answers)

Section 1: Basic Reaction Identification (1–20)

1. Identify the product of methane chlorination under UV light.

Answer: Chloromethane (CH_3Cl)

2. Ethene reacts with HBr. What is the product?

Answer: Bromoethane

3. Ethene + H_2 (Ni catalyst) \rightarrow ?

Answer: Ethane

4. Propene + HBr (no peroxide) \rightarrow ?

Answer: 2-Bromopropane (Markovnikov)

5. Propene + HBr (peroxide) \rightarrow ?

Answer: 1-Bromopropane (anti-Markovnikov)

6. Ethanol + PCC \rightarrow ?

Answer: Ethanal

7. Ethanol + KMnO_4 (strong) \rightarrow ?

Answer: Ethanoic acid

8. Benzene + $\text{Br}_2/\text{FeBr}_3$ \rightarrow ?

Answer: Bromobenzene

9. $\text{CH}_3\text{Cl} + \text{OH}^-$ \rightarrow ?

Answer: Methanol

10. $\text{CH}_3\text{CH}_2\text{Br} + \text{KOH}$ (alc) \rightarrow ?

Answer: Ethene

11. Acetylene + H_2 (Lindlar) \rightarrow ?

Answer: Ethene

12. Acetylene + excess H_2 \rightarrow ?

Answer: Ethane

13. Propanol + H_2SO_4 (heat) \rightarrow ?

Answer: Propene

14. Benzene + $\text{HNO}_3/\text{H}_2\text{SO}_4$ \rightarrow ?

Answer: Nitrobenzene

15. Toluene + KMnO_4 \rightarrow ?

Answer: Benzoic acid

16. Ethene + Br_2 \rightarrow ?

Answer: 1,2-Dibromoethane

17. $\text{CH}_3\text{COOH} + \text{NaOH}$ \rightarrow ?

Answer: Sodium acetate + water

18. Esterification: Ethanol + Acetic acid \rightarrow ?

Answer: Ethyl acetate

19. $\text{CH}_3\text{CH}_2\text{OH} + \text{SOCl}_2 \rightarrow ?$

Answer: $\text{CH}_3\text{CH}_2\text{Cl}$

20. Acetone + $\text{NaBH}_4 \rightarrow ?$

Answer: Isopropanol

Section 2: Mechanism-Based (21–40)

21. SN_1 reaction intermediate type?

Answer: Carbocation

22. SN_2 reaction rate depends on?

Answer: Substrate + nucleophile

23. Which is faster SN_1 : tertiary or primary?

Answer: Tertiary

24. Strong base favors which elimination?

Answer: E_2

25. Weak base favors?

Answer: E_1

26. Carbocation rearrangement occurs in?

Answer: SN_1/E_1

27. Best leaving group: Cl^- or OH^- ?

Answer: Cl^-

28. Nucleophile strength increases with?

Answer: Negative charge

29. Polar protic solvent favors?

Answer: SN_1

30. Polar aprotic solvent favors?

Answer: SN_2

31. E_2 requires what geometry?

Answer: Anti-periplanar

32. Rate of SN_2 increases with?

Answer: Less steric hindrance

33. Tertiary halide + strong base $\rightarrow ?$

Answer: Elimination

34. Primary halide + strong nucleophile $\rightarrow ?$

Answer: Substitution (SN_2)

35. Carbocation stability order?

Answer: $3^\circ > 2^\circ > 1^\circ$

36. Hyperconjugation stabilizes?

Answer: Carbocations

37. Inductive effect depends on?

Answer: Electronegativity

38. Aromatic substitution involves?

Answer: Electrophiles

39. Rate-determining step in SN1?
Answer: Carbocation formation
40. SN2 inversion of configuration called?
Answer: Walden inversion

Section 3: Numerical/Calculation-Based (41–70)

41. Moles of ethene in 28 g?
Answer: 1 mole
42. Molecular weight of ethanol?
Answer: 46 g/mol
43. 1 mole ethene gives how many moles ethane (hydrogenation)?
Answer: 1 mole
44. Yield = (actual/theoretical) × 100. If actual = 80g, theoretical = 100g?
Answer: 80%
45. Density = mass/volume. If 46g occupies 1L?
Answer: 46 g/L
46. % composition of carbon in CH₄?
Answer: 75%
47. Degree of unsaturation for C₄H₈?
Answer: 1
48. Empirical formula of C₂H₄?
Answer: CH₂
49. Number of isomers of C₄H₁₀?
Answer: 2
50. 1 mole = ? molecules
Answer: 6.022 × 10²³
51. pH of neutral solution?
Answer: 7
52. 10 moles ethanol mass?
Answer: 460 g
53. Avogadro number value?
Answer: 6.022 × 10²³
54. Molecular formula from empirical CH₂, molar mass 28?
Answer: C₂H₄
55. Combustion of 1 mole methane gives CO₂ moles?
Answer: 1 mole
56. Boiling point increases with?
Answer: Molecular weight
57. 2 moles H₂ needed for 1 mole alkyne → alkane?
Answer: Yes
58. Heat of reaction sign (exothermic)?
Answer: Negative

59. Reaction rate unit?
Answer: mol/L·s
60. Catalyst affects?
Answer: Rate, not equilibrium
61. Equilibrium constant depends on?
Answer: Temperature
62. Half-life formula for first order?
Answer: $0.693/k$
63. Increase temp increases rate because?
Answer: More collisions
64. Activation energy unit?
Answer: kJ/mol
65. Ideal gas equation?
Answer: $PV = nRT$
66. R value?
Answer: 8.314 J/mol·K
67. Molarity = ?
Answer: moles/liter
68. 1 L = ? mL
Answer: 1000 mL
69. Reaction quotient equals K at?
Answer: Equilibrium
70. Endothermic reaction absorbs?
Answer: Heat

Section 4: Advanced Reaction Prediction (71–100)

71. Friedel–Crafts alkylation reagent?
Answer: $AlCl_3$
72. Grignard reagent reacts with $CO_2 \rightarrow ?$
Answer: Carboxylic acid
73. Aldehyde + HCN $\rightarrow ?$
Answer: Cyanohydrin
74. Ketone reduction $\rightarrow ?$
Answer: Secondary alcohol
75. Aldehyde oxidation $\rightarrow ?$
Answer: Carboxylic acid
76. Alcohol dehydration $\rightarrow ?$
Answer: Alkene
77. Haloalkane + $NH_3 \rightarrow ?$
Answer: Amine
78. Benzene nitration temp ~?
Answer: $50^\circ C$

79. Phenol + NaOH \rightarrow ?
Answer: Sodium phenoxide
80. Carboxylic acid + alcohol \rightarrow ?
Answer: Ester
81. Alkene ozonolysis \rightarrow ?
Answer: Carbonyl compounds
82. Butene ozonolysis gives?
Answer: Aldehydes/ketones
83. Lucas test detects?
Answer: Alcohol class
84. Tollens test detects?
Answer: Aldehydes
85. Fehling solution gives?
Answer: Red precipitate
86. Aromatic ring activator example?
Answer: $-\text{OH}$
87. Deactivator example?
Answer: $-\text{NO}_2$
88. Ortho-para director example?
Answer: $-\text{CH}_3$
89. Meta director example?
Answer: $-\text{COOH}$
90. Polymerization of ethene gives?
Answer: Polyethene
91. Nylon formation type?
Answer: Condensation polymer
92. Soap formation reaction?
Answer: Saponification
93. Ester hydrolysis gives?
Answer: Acid + alcohol
94. Amide hydrolysis gives?
Answer: Acid + amine
95. Alkyl halide + metal \rightarrow ?
Answer: Organometallic
96. Benzene hydrogenation \rightarrow ?
Answer: Cyclohexane
97. Ether cleavage with HI \rightarrow ?
Answer: Alcohol + alkyl iodide
98. Aldol condensation product?
Answer: β -hydroxy aldehyde
99. Cannizzaro reaction occurs in?
Answer: Non-enolizable aldehydes
100. Diels–Alder reaction forms?
Answer: Cyclohexene derivative

