1. Write the pKa value in $\text{H}_2\text{O}$.

1) $\text{TMS}-\text{N}^+\text{H}$
2) $\text{Cl}_3\text{C}^+\text{H}$

3) $\text{R}^+\text{O}^+\text{O}^\text{R}$
4) $\text{N}=\text{H}$

5) $\text{Me}\text{Me}\text{Me}^+\text{H}$
6) $\text{H}\text{S}\text{Me}^\text{O}$

7) $\text{MeO}^+\text{H}$
8) $\text{Et}^\text{O}^\text{N}^+\text{H}$

9) $\text{F}_3\text{C}^+\text{O}^\text{O}^\text{H}$
10) $\text{Ph}^\text{S}^\text{H}$

演習で学ぶ有機反応機構pp.254-257 (化学同人)
2. 

![Chemical structure image](image1)

\[ \text{MeO} \quad \text{N} \quad \text{Ph} \] 

1) NaH, BrH\(_2\)C\(\equiv\)Me, DMF, 60 °C

2) LiAlH\(_4\), AlCl\(_3\), Et\(_2\)O, 0 °C

3) m-CPBA, CH\(_2\)Cl\(_2\), rt; K\(_2\)CN (excess), DMF/H\(_2\)O

50 °C

\[ \text{MeO} \quad \text{N} \quad \text{Me} \quad \text{Ph} \]

92% (2 steps)


3. 

![Chemical structure image](image2)

\[ \text{NH}_2\text{OH-HCl} \quad \text{pyridine} \] 

MeOH, 45 °C

94%

1) Br\(_2\), AlCl\(_3\), 80 °C

2) trisyl azide, n-Bu\(_4\)NBr

A, NEt\(_3\), THF, 0 °C to rt

65%

3) n-CPBA, CH\(_2\)Cl\(_2\), rt; K\(_2\)CN (excess), DMF/H\(_2\)O

54%


4. 

![Chemical structure image](image3)

\[ \text{OTMS} \quad \text{Me} \] 

THF

45 °C to reflux

42%

1) Br\(_2\), AlCl\(_3\), 80 °C

2) trisyl azide, n-Bu\(_4\)NBr

18-crown-6, KOH benzene-H\(_2\)O, rt

77%

\[ \text{hv (254 nm)} \quad \text{1,2-dichloroethane; reflux} \] 

62%


5. 

![Chemical structure image](image4)

\[ \text{CH}_2\text{SiMe}_3 \quad \text{Me} \] 

1) 150 °C, sealed tube

84%

2) n-BuLi, THF

−78 to 0 °C; i-AmONO, 0 °C to rt

42%

3) NaOH aq., NH\(_3\) aq.

NaOCl aq., THF

5 °C to rt

4) hv, Et\(_2\)O, −73 °C to rt; filt.; evap.; silica gel, Et\(_2\)O, rt

60% (2 steps)


6. 

![Chemical structure image](image5)

\[ \text{C}_{10}\text{H}_{11}\text{N}_{2}\text{OS} \] 

Ph

C\(_{22}\)H\(_{17}\)NOS

92% (2 steps)