I. Provide the likely product(s) with proper stereochemistry and indicate the major one if more than one product formed. (3 points for each question)

1. \[
\begin{align*}
\text{1) BH}_3/\text{THF} \\
\text{2) NaOH/ H}_2\text{O}_2
\end{align*}
\]

2. \[
\text{OH}^- \\
\text{NaCN(cat.)}
\]

3. \[
\text{NC}_2\text{CN} + \text{CH}_2\text{CHO} \rightarrow \text{NaOMe}
\]

4. \[
\text{CH}_2\text{N}_2/\text{BF}_3
\]

5. \[
\text{LDA/} \\
\text{work-up}
\]

6. \[
\text{P(OMe)}_3
\]

7. \[
\text{heat} \\
225^\circ\text{C}
\]

8. \[
\text{1) Br}_2 \\
\text{2) KOH}
\]
9. HCl

10. 1) 2.1 eq t-BuOK
2) 2 eq MeI

11. \(\text{CO}_2\text{Me}\)

12. 1) 2.5 eq EtMgBr
2) \(\text{H}_3\text{O}^+\)

13. \(\text{NaBH}_4\)

14. \(\text{MeOH} / \text{H}_2\text{SO}_4\)

15. 1) BnBr
2) \(\text{H}_2\text{NNH}_2\)

16. 1) \(\text{Br}_2 / \text{NaOH}\)
2) \(\text{H}^+\)
II. Give a brief definition and an example for each of the following chemical reactions. (5 points for each question)

1. regioselective
2. stereoselective
3. stereospecific
4. enantioselective

III. On treatment with HCl and NaNO₂ for the following two compounds individually, provide the product(s) for each and account for the difference. (10 points)
IV. The following compounds show different rates of debromination. One reacts quite fast, and the other seems not to react at all. Explain this surprising difference in rates. (10 points)