1. Explain why a resist with higher contrast can lead to higher resolution of features transferred from a mask to the wafer surface than a resist with lower contrast. Illustrate your answer with appropriate figures.

2. Using the Rayleigh criterion, calculate the minimum feature size that can be resolved in a system with a 0.18 NA lens when g-line and i-line radiation from a Mercury spectrum is used. Repeat this exercise for 0.30 NA and 0.36 NA lenses. Assume a k-factor $k_1 = 0.45$.

3. The diagram below shows the profile for a certain photoresist after it has been developed on a Si sample.

   (a) Is this a positive or a negative resist? Why?
   
   (b) Would this resist profile work well for a metal lift-off process? Why?

4. Reading Assignment: *Fundamentals of Semiconductor Fabrication*, Chapter 1, Chapter 4 up to 4.2.1 (you don’t need to read 4.2.2-4.2.5 or 4.3)