520/530/580.495 Microfabrication Lab
520.773 Advanced Topics in Fabrication and Microengineering

Homework #2

Question 1 (project)

In no more than 1000 words and maximum of two figures describe an application of **either**

1. Flow cytometer on a chip
2. Waveguides on a chip

Questions 2 and 3 (silicon material)

Problem 2 and 16, in Chapter 2 of the textbook.

Question 4 (mask design)

You want to make a photomask to fabricate a device for the first time. As you don't have any mask design experience, you are concerning about the design errors you may have that can be costly when a quartz mask is used. While printing out transparencies for a talk you are about to give, you come up with an idea of making masks with a laser printer in your lab.

(1) Theoretically, what is the smallest feature (in microns) you can print with a common high-resolution printer (1200dpi)? If the minimum feature size in your design is 5-um, what will be the printer resolution required? Does such a printer exist?
(2) Do some survey to find printing shops that provide printing resolution better than 5000 dpi and check the price of printing?
(3) Since printer toner and transcendences are not designed for masks, what are the potential problems you may encounter while using the transparency masks for microfabrication?

Question 5: (CAD tools)

Do research on the web to find out:

1. What is GDS and CIF
2. What other CAD tools exist to do mask design and how expensive are they ? (Find at least 3 tools).

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