Quiz #1 (Take-Home)

Name: ___________________________ Student ID: ___________________________ Web ID: ___________________________

Question 1. (10 pts) Optical lithography.

(a) What would be the achievable minimum feature size for the 193nm immersion (193i) lithography with 1.44NA?

(b) What about the achievable minimum feature size for the 3rd-generation 193i lithography of 1.65NA with high refractive index fluid?

Question 2. (8 pts) Nodes a and b are in distinct partitions. Assume that the respective internal and external costs of node a are 7 and 3, and the respective internal and external costs of node b are 2 and 5. Then, can we swap nodes a and b to reduce the cut cost? Why?

Question 3. (8 pts) Referring to the configuration shown below, let the gain of net cut for moving the cell C3 to its opposite side be g. Find g.

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A  |\       |B
C1|  cutline |  C3
C2|       |  C4
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Question 4. (10 pts) For the configuration shown below, let nodes a and b be fixed nodes that are placed at the given locations, c and d be movable nodes that can be moved to the center of either Partition A or Partition B. net n1 connects nodes a and c, and net n2 connects nodes b and d. The center-to-center distance for the two partitions A and B is 32. Please find the cut weights for nets n1 and n2 to establish an exact net weight model to capture the wirelength cost precisely.

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A  |\       |B
n1\|\       |\ n2
a  \|\       |\ d
5  7  20   32
A  |\       |B
n1\|\       |\ n2
c  \|\       |\ d
```

fixed nodes: a, b
movable nodes: c, d