21.04.2025

MNT 503
Nanoscale Synthesis and Characterization
(2024-2025 Spring)

Assignment 4

1- Which one of the followings is not a lithographic technique?

- ☐ photolithography
- ☐ e-beam lithography
- ☐ X-Ray Lithography
- ☐ machining lithography
- ☐ nano-imprint lithography

2- Choose the odd one out about the photolithography

- ☐ uses UV-light
- ☐ pattern is transffered to a photoresist using a glass (quartz) or polymeric mask
- ☐ substrate material (usually n- or p-Si) is coated with positive or negative photoresist
- ☐ affected/unaffected regions of resist is removed by e-beam
- ☐ shorter wavelength radition increases the resolution

3- Choose the correct statement about e-beam lithography

- ☐ uses masks to transfer image to resist
- ☐ it does not need resist coating on the substrate
- ☐ the planned image is directly written on resist by e-beam
- ☐ the resolution is comperatively lower than photolithography
- ☐ it does not needn clean room environment

4- Which one of the followings is not related to nano-imprint lithography?

- ☐ ultra-violet and thermal nano-imprint lithography are two kinds of nano-imprint lithography
- ☐ it is easy to create multi layer structure
- ☐ PMMA resist is heated above its glass transition temperature
- ☐ it has relatively higher resolution
- ☐ difficult to imprint on non-flat surfaces

5- Scanning probe lithography is used to manipulate atoms on surfaces and to fabricate nanopatterns by their probe tips.....**T F**

6- In AFM probe lithography, a cantilever can be used to write a pattern on a photoresist.....**T F**

7- Focused ion beam (FIB) technique creates nano patterns by deposition or sputtering; therefore, it is classified as bottom-up or top-down approach depending on the process utilized…….. **T F**