

Please answer either in English or Finnish.

1. Explain briefly (max. 2 pages altogether, draw schematics if needed):
 - a) extreme ultraviolet (EUV) lithography
 - b) phase-shift mask in optical lithography
 - c) break-junction technique in molecular electronics
 - d) nanocomposites
 - e) principle of a read head of magnetic disk drive (GMR effect)
 - f) superhydrophobic surfaces(each 1 p)

2. Nanoimprint lithography and comparison to other nanolithography techniques. (6 p)

3. Structure, fabrication and properties of graphene. (6 p)

4. a) Atomic layer deposition (ALD). (3 p)
b) Three examples of biomimetics (3 p)

5. a) Structure and basic operation principle of a single electron transistor (SET). (3 p)
b) Effect of surface charge and Debye length in nanofluidics. (3 p)