17.03.2025

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

Assignment 1

1- Which one of the followings is an important issue in fabricating of nanostructures?
- ☐ dimension
- ☐ morphology
- ☐ structure
- ☐ composition
- ☐ all of them

2- Choose the odd one out about bottom-up synthesis technique.
- ☐ fabrication is relatively expensive
- ☐ it starts with atoms or molecules
- ☐ physical forces are operative in building nanostructures
- ☐ formation of nanoparticles from colloidal solution is a bottom-up technique
- ☐ physical vapor deposition technique uses bottom-up approach

3- Choose the false statement about thin film deposition techniques
- ☐ deposition is achieved by mechanical, chemical or high vacuum (physical) evaporation methods
- ☐ they are bottom-up technology
- ☐ vapor deposition methods are two kinds: physical and chemical vapor deposition methods
- ☐ only micrometer thick coatings can be produced
- ☐ emission, transport and condensation of particles are the common steps of deposition techniques

4- Which one of the followings is true about PVD?
- ☐ it is a gas phase deposition technique and carried out under high vacuum level
- ☐ as vacuum level increases (small vacuum number) more dense films are obtained since mean free path (λ) increases
- ☐ both thermal and e-beam methods are classified as evaporation methods
- ☐ common sputter methods are DC, RF and magnetron sputtering methods
- ☐ all of them

5- Which one of the followings is not related to sputtering technique
- ☐ DC sputtering is used only for metals
- ☐ atoms are ejected from target material by impact of energetic ions
- ☐ all of the sputtering techniques make use of Ar ions
- ☐ ceramic depostion is possible by RF sputtering
- ☐ deposition rate in sputtering is relatively low compared to thermal PVD methods

6- Thermal PVD techniques can be used to deposit dielectrics on a substrate……..……**T F**

7- In magnetron sputtering techniques, magnetic field is used to trap electrons to be used in ionization of argon……..……**T F**

8- Oblique angle deposition technique is a PVD technique in which angle of incidence is lower than 70^{o} ……**T F**