

Department of Biochemical Engineering and Biotechnology
 BEL 721 Bionanotechnology
 Major (IInd Semester 2015-2016)

Sushobh Karmali

Max. Marks: 40
 Max. Time 2 hrs

✓ 1a	What is the design principle of synthesizing molecular lego? How this can be used for designing molecular actuators? [2+3]
✓ 1b	Discuss the design principle of a molecule to remove cholera toxin using molecular lego? [2]
✓ 1c	Give the diagrammatic presentation of open and closed acetyl choline receptor mediated ion channels and their current recordings. What are the different forms of patch clamp technique? [1+2]
✓ 2a	What is the basic principle of molecular imprinting? What are the applications of this technique in separation? Explain with examples and illustrations separation of chiral molecules and proteins, respectively. [0.5+0.5+2+2]
2b	What are the applications of S-Layer in diagnostics? How the genetic approach has helped in existing S-Layer technologies? [1+2]
2c	What are peptosomes? How do you prepare them? [2]
3a	What are the molecular events involved in photocycle of bacteriorhodopsin? How do you prepare bacteriorhodopsin films? [3+1]
3b	What are cermets? How do you produce them biologically? [3]
3c	What is magnetic hyperthermia? What are the advantages of using magnetosomes for magnetic fluid hyperthermia? [3]
✓ 4a	What are the different steps in developing DNA-templated field effect transistors (FETs)? What are the limitations of these FETs? [2]
✓ 4b	What is the basic principle of SERS? How do we employ SERS for bacterial detection? What are the limitations of this technique? [2]
✓ 4c	What are the different possible ways for using biomolecular motor for drug delivery? [2]
4d	What is photodynamic therapy (PDT)? How this approach has been used for cancer treatment? [2]
4e	What is biomolecular corona of nanoparticles? How this understanding can help in design of drug delivery carriers? [2]