Department of Biochemical Engineering and Biotechnology
BEL 721 Bionanotechnology
Major (IInd Semester 2014-2015)

Max. Marks: 45

Max. Time 2 hrs

1a	What are lipid chips? Write the advantages of S-layer supported bilayer over solid supported bilayer? [1+2]
1b	What are the challenges in technical application of bacteriorhodopsin? Which form of bacteriorhodopsin has potential to be used in long term photo rewritable storage of information? What are limitations in the use of bacteriorhodopsin for this purpose? [1+2+2]
1c	How will you prepare Shell Cross-linked Knedel's (SCKs)? What are the applications of stimuli responsive nanocapsules? [2+2]
2a	Discuss the design principle to synthesize a molecule lego to remove cholera toxin? [3]
2b	What is the process of synthesizing Quantum dots using organometallics? How can one convert hydrophobic QDs to biocompatible nanocrystals for biological applications? [2+3]
2c	What do you understand by biomolecular corona? How can you characterize corona through immune-gold labels? [1+3]
3a	What is molecular imprinting? How can one use nano MIP based optical sensor for detection of pharmaceuticals? [2+2]
3b	What are advantages of using bacterial magnetosomes for magnetic fluid hyperthermia? [3]
3c	How can one sequence DNA using electrical conductance measurements? What are limitations of this process? [3+1]
4a	How can one use carbon nanotube assisted optical activation for signaling and to kill cancer cells? [3]
4b	What are DNA nanobots? How can they be used to deliver drugs? What are the limitations of these nanobots? [1+2+1]
4c	How will you use nanobodies for detection of viruses such as influenza virus H5N1? [3]