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Department of Biochemical Engineering and Biotechnology

BEL 721 Bionanotechnology
Minor I (IInd Semester 2015-2016)

Max. Marks: 20
Max. Time 1 h

1a	'Self assembly system has been used to bring together electronically active materials to make self-made sandwich'. Discuss giving illustrations. [2]
1b	What are lipid chips? What are the advantages of S-layer supported bilayer over solid supported bilayer? [1+2]
1c	Justify that S-layers act as template for the formation of regularly arranged nanoparticles using ion milling as well as wet chemical process. [3]
2a	What is super paramagnetic limit? How will you use biomimetic approach to synthesize and fabricate magnetic nanoparticles of high density data storage? Give steps for such synthetic process and diagrammatic illustrations. [0.5+1+2.5]
2b	What are the challenges in technical applications of bacteriorhodopsin? Using bacteriorhodopsin how will you develop device for artificial retina? Discuss the potential of bacteriorhodopsin for read out in 3D memories? [1+3+1.5]
2c	What are dendrimers? How are they different from conventional micelles? What are advantages and limitations of amphiphilic dendrimers? [0.5+1+1]

$$(1+x) + (1+x)^2 + (1+x)^3 + \dots$$

$$\frac{a}{2} (1+x)$$
$$a (2^n - 1)$$
$$\frac{(1+x)((1+x)^n - 1)}{x}$$