

M.Sc. Physics Examination

Semester - IV

Nanofluidics, Microfluidics and Optofluidics (Phys- N402)

Paper Code-.4757.

Time: 2 Hours 30 min

April 2016

Maximum Marks 70

Attempt all questions. Figures to the right indicate marks.

1.	Write in detail, 'Quantum and classical Regimes of electron transport'	[14]
OR		
1.	Discuss double barrier resonant phenomena in semiconductor nano structures with example (with necessary block diagrams and figures)	[14]
2.	(a) Give brief but adequate information about Scilab and Matlab and also mention some salient features of them	[14]
OR		
2.	(a) Define ab initio, mention different types of ab initio electronics structure methods (b) Write a note on: DFT	[07] [07]
3.	(a) Discuss in detail: Importance to study solid liquid interface in nanostructures (b) Derive Poisson Boltzman equations	[07] [07]
OR		
3.	a. Write an introductory notes on MEMS and NEMS b. Define Electrophoresis, Explain with examples	[07] [07]
4.	a. Write short note on 'Magnetocaloric energy conservation' b. Discuss effects of particle size on coercivity of ferromagnetic materials and effects on its magnetic properties	[07] [07]
OR		
4.	Explain in detail stability requirements of magnetic materials	[14]
5.	Explain: Fibrillation model, Electric double layer model in contest of ER effect	[14]
OR		
5.	a. Compare different properties of ER/MR and ferromagnetic fluids b. Discuss forces relevant to the Electro-rheological (ER) fluids	[14]