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**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Nano Photonics**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART - A**

- 1 a. What are optical coatings? Explain about four different types of optical coatings. (10 Marks)
- b. Write a brief note on: i) Diffraction and interference ii) Absorption and scattering. (10 Marks)
- 2 a. Explain about photonic crystal fiber and its construction. (06 Marks)
- b. Write a note on dielectric mirrors. (04 Marks)
- c. Brief about photonic band-gap and photonic crystal sensing. (10 Marks)
- 3 a. Write a note on: i) Semiconductors ii) Wave guide iii) 2-D photonic crystal and iv) 1-D photonic crystal. (10 Marks)
- b. Explain about photonic crystal fibers and 4 tunable photonic crystal filters. (10 Marks)
- 4 a. What are plasmons? Explain about surface Plasmon resonance. (06 Marks)
- b. Write about plasmonics and nanoparticles. (04 Marks)
- c. Explain and derive an expression for Grating SPR coupling. (10 Marks)

**PART - B**

- 5 a. Explain about free space propagation model. (05 Marks)
- b. Write a note on nano scale confinement of electronic interactions and explain about semi conducting properties. (05 Marks)
- c. Define photons and electrons. Give the similarities and differences between them. (05 Marks)
- d. Explain about nanoscale electronic energy transfer. (05 Marks)
- 6 a. Explain about adiabatic nanofabrications. Give its working principle. (10 Marks)
- b. Write briefly about self assembly method via optical near field interactions. (10 Marks)
- 7 a. Explain about parallel architecture using optical excitation transfer. (10 Marks)
- b. Describe briefly about interconnections for nanophotonics along with broad cast inter connects. (10 Marks)
- 8 a. Brief about Purcell factors. (04 Marks)
- b. Define quantum well. Explain about resonant cavity quantum well lasers and LED. (10 Marks)
- c. Write a brief note on resonant cavity LED. (06 Marks)

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