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**Seventh Semester B.E. Degree Examination, Dec.2014/Jan.2015**

**Optical Fiber Communication**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. With neat sketches of RI profile and wave propagation in optical fiber communication, compare different types of fibers? (08 Marks)
- b. With neat sketches, explain the characteristics and operating ranges of the four key optical fiber link components. (07 Marks)
- c. Explain MCVD process for manufacturing low loss GI fiber. (05 Marks)
- 2 a. Explain different types of attenuation in optical fiber. (06 Marks)
- b. Classify and explain chromatic dispersion within a single mode fiber. (08 Marks)
- c. Consider a 10 km long multimode in which  $n_1 = 1.483$  and  $\Delta = 0.01$ . Calculate  $n_2$  and pulse broadning after travelling 10 km. (06 Marks)
- 3 a. Explain with schematic an LED which is highly directional and sketch the spectral emission pattern of an LED. (07 Marks)
- b. Compare operating parameters of  $G_e$ ,  $S_i$  and InGaAs of PIN and APD. (07 Marks)
- c. With neat sketch, explain RAPD structure and the electrical fields. (06 Marks)
- 4 a. Explain different types of fiber splicing methods used for optical fibers. Explain electric arc fusion splicing. (08 Marks)
- b. Explain expanded beam fiber optic connector. (05 Marks)
- c. List several possible lensing scheme and explain briefly non imaging lensing scheme. (07 Marks)

**PART – B**

- 5 a. Draw a signal path through a digital link with relevant components and optical/electrical waveforms at every stage. (06 Marks)
- b. What are the noise sources and disturbances that arise in optical pulse detection mechanism? Explain them in detail. (06 Marks)
- c. Draw and explain eye pattern and mark the fundamental measurement parameter. (08 Marks)
- 6 a. What is rise time budget? Explain its significance. Derive an expression for the system rise time budget in terms of transmitter, fiber and receiver rise time. (08 Marks)
- b. Explain subcarrier multiplexing, with neat block diagram. (05 Marks)
- c. Derive an expression for the CNR of an analog communication system under limiting condition of noise sources involved. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Explain WDM networks containing various types of optical amplifiers. (07 Marks)  
b. Write a note on MZI multiplexer. (07 Marks)  
c. Explain dielectric thin film filter and its applications. (06 Marks)
- 8 a. With neat energy level diagram, explain EDFA. (10 Marks)  
b. Write a note on :  
i) Basic format of  
STS – N – SONET and  
STM – N – SDH frame  
ii) High speed light wave links. (10 Marks)

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