Dr. AK

Main examination

Reg. No. | | | | | | | | | | |

Manipal University, Manipal
Second Semester M.Sc.(Physics)
End Semester Examination, May 2016
Subject: Opto Electronics-III (PHY-708.4)
(Credit System)

Time: 3 hours Marks: 50

Answer any five full questions.

1. (a) Write the main characteristic properties of optical fibers used in fiber communications. [3]

(b) What is ISI? [2]

(c) A symmetrical step-index planar waveguide is made of glass with $n_1 = 1.49$ and $n_2 = 1.48$. The thickness of the guide layer is 10μm and the guide is excited by a source of wavelength $\lambda = 850nm$. What is the range of propagation constant? What is the maximum number of modes supported by the guide? [5]

2.(a) What is wavelength division multiplexing (WDM)? Elaborate with schematic diagram. What are the advantages of WDM? [5]

(b) Make a rise time budget for a 0.85μm, 150 km fiber link designed to operate at 622 Mbps. The LED transmitter and the Si PIN receiver have rise times of 0.1 ns and 0.5 ns, respectively. The graded index fiber has $D = 18$ps/km-nm. The LED spectral width is 0.15 nm. Can the system be designed to operate with NRZ format? [5]

3. (a) Explain the working of phase grating in diffractive interconnect? [4]

(b) What are demultiplexer, multiplexer, and optical add-drop

4. (a) What is optical time-division multiplexing (TDM)? Explain with the help of schematic diagram. [4]

(b) How can a bistable system be used as an optical gate? [3]

(c) Briefly discuss the principle of optical bistability. [3]

5. (a) Which parameters are used to characterise an optical switch? [3]

(b) What is the difference between optical space switch and all-optical switch? [2]

(c) Write a short note on mechano-optic switches. [5]

6. (a) What are coherence requirements of holography? [3]

(b) Write any three applications of holography. [2]

(c) Explain recording of volume holograms. [5]