

DAYANANDA SAGAR COLLEGE OF ENGINEERING,
Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078
Department of Telecommunication Engineering

Subject: Optical fiber communication

Sub Code : 17TE7DCOCN

Faculty name: Mr.Jayanth.C

Module questions: 1&2

Q.No	Question Description	Marks
1.	Discuss briefly advantages, applications and disadvantages of optical fibre as compared to copper cables?	
2.	Explain the structure of single mode and multimode step index and graded-index optical fibers with cross section and ray path.	
3.	Explain the ray theory of the optical fiber with the help of a neat sketch and also explain Acceptance angle and derive the numerical aperture of a step index fiber (SIF) from snell's law.	
4.	What are the different fiber materials used in optical communication? Explain briefly.	
5.	i) Derive the necessary mathematical condition that the angle of incidence θ must satisfy for the optical skew ray to propagate in a step index fiber. ii) Discuss briefly Mode Field Diameter (MFD) of a single mode fiber.	
6.	i) Discuss briefly various attenuation mechanisms in an optical fiber.	
7.	ii) Briefly explain different mechanisms which cause absorption losses in optical fibers.	
8.	Discuss the equations for material dispersion and waveguide dispersion in the optical fiber.	
9.	Discuss briefly Macro-bending and Micro-bending losses with a neat diagram.	

Problems: From Senior text book (solved) : 2.1, 2.3, 2.4, 2.5

From Keiser (solved) : 2.2

From Keiser (unsolved) : 2.7, 2.18, 2.19, 2.20, 2.21, 2.22, 2.12

Unit – 2 Problems: From Senior text book (solved) : 3.1, 3.4, 3.6

From Keiser (solved) : 3.2 , 3.3, 3.4 (unsolved)

Module questions: 2

1. Discuss briefly principle of Pin-Photodetector with equations.
2. Discuss briefly structure of Avalanche Photodiode with equations.
3. Describe briefly signal to noise ratio at the output of an optical receiver with expressions and describe the different types of noise sources in the case of Photodetectors with expressions. Write its equivalent circuit and a simple model of Photodetector receiver.
4. Describe the signal path through an optical digital signal transmission with diagrams and basic sections of an optical receiver.
5. Briefly Discuss the Noise sources and disturbances with equations in an optical pulse detection mechanisms,
6. What is splicing? Explain the fusion splicing of optical fibers with neat diagram.
7. Explain the two broad categories of front-end amplifiers used in optical fiber with associated general structures.

8. Discuss the features of Eye-pattern features showing the definitions of fundamental measurement parameters with diagram.