

Optical Communication

Instructions:

This is an open-book take-home mid-term assignment, to be submitted by 12:00 noon, Friday, April 17th, 2020. You may consult the textbook, your notes, and any material posted on sic. No other sources of information are allowed, including friends, classmates, materials from other classes, tutors, etc. Please write your solutions as clearly and neatly as possible. Also, show all your work, preferably with explanations for each step. If you are asked to do a problem a specific way (for example, “use the standard representation. . .”), then you will receive no credit for doing it any other way. You will also receive no credit for answers without sufficient work to produce them. Attempt all questions. Answers copied will both be marked zero. Late submission will not be accepted and marked zero.

How to Submit?

- 1. Write your names and Ids at the top of answer sheet.***
- 2. Scan / Take Photo of each paper and save each photo with a number. E.g. photo of paper 1 of answer sheet be saved with name 1.jpg, then 2.jpg and so on.***
- 3. Put all answer photos in a word file by simply copy and pasting images, name the document with subject name, your name and id e.g. OC_Ali_12345.***
- 4. You will be provided upload link on sic to submit your answers go to Lectures section and click on Upload Assignment and upload your answers document file in the subject.***

- Q.No. 1 A Why Fiber-optic communications? Explain in detail the basic blocks of fiber optic communications systems?
 B Describe and differentiate between LED and LD. Explain its principle of action and types of LD.
- Q.No. 2 A Explain the Phenomena of Total Internal Reflection. Support your answer with the help of diagram.
 B What is cable-loss factor? Explain the relation $P_{out}=P_{in} \times 10^{-AL/10}$.
- Q.No. 3 The refractive Indexes of the core and cladding of a silica fiber are 1.48 and 1.46 respectively. Find
- a) Critical Incident angle, show critical incident angle using figure?
 - b) Critical Propagation angle, also explain why is critical propagation angle so important?
 - c) Acceptance angle, what is the relation between spatial angle and acceptance angle?
 - d) Numerical Aperture and explain the relation $\theta_{1c} \rightarrow \alpha_c \rightarrow \theta_a \rightarrow NA$