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Bengaluru

Mid Term Examinations - October 2026

Date: 05/10/2026 **Time:** 11:45 AM - 01:15 PM

Course Code: ECE3061 **Course Name:** Optical Communication

Semester: Seventh Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	24	22	44

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	A system must operate in an RF-sensitive environment. Why could OWC be considered?	2	CO1	BT2
2	Why is a direct-band-gap semiconductor preferred for an LED?	2	CO3	BT2
3	An LED has a radiative lifetime of 30 ns and a non-radiative lifetime of 70 ns. Calculate its internal quantum efficiency.	2	CO3	BT2
4	Differentiate between RF communication and OWC based on wall penetration and EMI.	2	CO1	BT2
5	What is meant by Maximum Permissible Exposure (MPE) in optical wireless communication?	2	CO2	BT1

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	An OWC transmitter operates at 900 nm. Explain why eye-safety regulations are particularly stringent around this wavelength region. Also discuss how the situation changes for operation at wavelengths of 1500 nm and above.	10	CO2	BT2
7	Analyze the major environmental factors that can degrade the performance and reliability of an Optical Wireless Communication (OWC) link. Explain how fog, rain, atmospheric turbulence, background light, and physical obstructions affect the link.	10	CO2	BT4

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	A student argues that “stimulated emission can dominate naturally because photons are continuously being emitted from an excited medium.” Analyze this statement and explain why population inversion and pumping are essential for laser operation.	10	CO3	BT4
9	Both LEDs and laser diodes are optical sources used in communication systems. Analyze why a laser diode can support applications requiring characteristics different from those of an LED. Compare the two sources with respect to emission mechanism, spectral characteristics, directionality, and modulation capability.	10	CO3	BT4

PART D: Answer Any 1 Following Questions. 10 M

PTO (Please Turn Over)

Q.N.	Questions	M	CO	BT
10	Examine the historical development of Optical Wireless Communication (OWC) and highlight the major technological advancements that shaped its evolution.	10	CO1	BT2
11	Discuss the challenges faced in OWC such as path loss, atmospheric effects, and alignment issues.	10	CO1	BT2

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	Analyze the fundamental photometric quantities used to characterize a lighting system. Explain luminous flux, luminous intensity, illuminance, and luminance, and distinguish between them with their units and practical significance.	10	CO3	BT4
13	Explain the operating principle of an APD and analyze why very high avalanche gain can reduce the bandwidth of the detector.	10	CO3	BT4