

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Sixth Semester**Electronics and Communication Engineering***CEC345 - Optical Communication & Networks***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No.</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	List advantages of optical fiber communication.	L2	1	2
2.	Define numerical aperture.	L1	1	2
3.	Compare the intrinsic and extrinsic absorption mechanisms.	L2	2	2
4.	What is waveguide dispersion?	L1	2	2
5.	Identify the optical light source are available.	L2	3	2
6.	Define the quantum efficiency.	L1	3	2
7.	How to measure fiber optic cable?	L1	4	2
8.	Elucidate field measurements in optical fiber.	L2	4	2
9.	Mention the types of optical network protection.	L2	5	2
10.	Outline the main features of the optical transport network.	L1	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Draw the neat diagram and explain the ray theory behind the optical fiber communication with a special mention about total internal reflection, acceptance angle, skew rays.	L3	1	16
	Or			
	b i Explain about step index and graded index fiber with their index profile diagrams.	L3	1	10
	ii A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine the critical angle at the core-cladding interface and NA for the fiber.	L3	1	6
12.	a Briefly describe linear scattering losses in optical fibers with regard to: i. Rayleigh scattering ii. Mie scattering	L2	2	16
	Or			
	b i Discuss material dispersion with necessary mathematical expressions.	L2	2	8
	ii Illustrate the multimode graded index fiber.	L2	2	8

13.	a	i	Explain the principles of absorption and emission of radiation with neat diagram.	L3	3	8
		ii	When 3×10^{11} photons each with a wavelength of $0.85\mu\text{m}$ are incident on a photodiode, on average 1.2×10^{11} electrons are collected at the terminals of the device. Determine the quantum efficiency and the responsivity of the photodiode at $0.85\mu\text{m}$.	L3	3	8
			Or			
	b		Discuss about surface emitting LED and edge emitting LED with neat sketch.	L3	3	16
14.	a		Demonstrate the following in detail: i. Total fiber attenuation measurement ii. Fiber cut off wavelength measurements	L2	4	16
			Or			
	b		Discuss on the numerical aperture measurements of optical fiber.	L2	4	16
15.	a		Explain the distinguishing features of optical switching and optical wavelength routing. With the aid of block diagrams outline the optical network hierarchy for the public telecommunications network.	L2	5	16
			Or			
	b		Illustrate the following optical switching networks: i. Optical circuit switched networks ii. Optical packet switched networks	L2	5	16