Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

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)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	Define Critical angle and Acceptance angle.	L1	1	2
2.	List the advantages of optical fiber communication.	L2	1	2
3.	What do you mean by attenuation and dispersion?	L1	2	2
4.	What are the factors cause Rayleigh scattering in optical fiber?	L1	2	2
5.	Compare surface emitter LED with edge emitter LED.	L2	3	2
6.	Identify the three basic concepts underlying the operation of an LED.	L2	3	2
7.	Write the expression for numerical aperture of an optical fiber.	L1	4	2
8.	What is meant by fiber dispersion? and Mention the types of its measurements?	L1	4	2
9.	List the advantages of WDM.	L2	5	2
10.	What is Optical Ethernet?	L1	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Explain the elements of an optical fiber transmission link with neat diagram.	L2	1	10
		ii	A multimode step index fiber with a core diameter of 80 µm and a relative index difference of 1.5 % is operating at a wavelength of 0.85 µm. If the core refractive index is 1.48%, Determine i. The normalized frequency for the fiber and ii. The number of guided modes.	L3	1	6
			Or			
	b		Explain the Ray theory phenomenon using Snell's law with relevant diagram and expressions.	L2	1	16
12.	a	i	Describe the scattering losses and bending losses in optical fibers with relevant expressions and sketch.	L2	2	8
		ii	Derive the expression for the material dispersion of optical fibers.	L2	2	8
			Or			
	b		What is meant by attenuation? Explain the different attenuation mechanisms that contribute to the optical fibers with relevant expressions and diagrams.	L2	2	16

13.	a	i	Determine the quantum efficiency and responsivity of the photodiode at 0.75 µm when 2 x 10^{11} photons with 0.75 µm wavelength incident on photodiode, on average 1.2 x 10^{11} electrons – hole pairs are generated at the terminals of the device.	L3	3	6
		ii	Explain the working principle and structure of a surface-emitting LED.	L2	3	10
			Or			
	b		Briefly explain principle operation of P-I-N diode and Avalanche photo diode with necessary diagrams and expressions	L2	3	16
14.	a	i	Explain in detail the method to measure total fiber attenuation.	L2	4	8
		ii	Describe the time-domain and frequency-domain methods for measuring fiber dispersion.	L2	4	8
			Or			
	b		Illustrate the procedure for fiber cutoff wavelength measurements. Explain its significance in optical communication systems.	L2	4	16
15.	a	i	Compare the architectures of synchronous networks and asynchronous transfer mode.	L2	5	8
		ii	Describe the concept of optical Ethernet.	L2	5	8
			Or			
	b		Describe the architecture and operation of wavelength-routing networks. Discuss the challenges and strategies for routing and wavelength assignment.	L2	5	16