GIET UNIVERSITY, GUNUPUR – 765022

M. Sc. (Third Semester) Examinations, December – 2023

22PHCBOE306 - Optical Fiber & Optoelectronics

(Physics)

Time: 3 hrs   Maximum: 70 Marks

(The figures in the right-hand margin indicate marks.)

PART – A   (2 x 10 =20 Marks)

Q.1. Answer *ALL* Questions

		CO #	Blooms Level
a.	Find the Numerical Aperture and acceptance angle of an optical fibre cable with a cladding index of 1.378 and core index of 1.546.	CO1	K2
b.	What is the principle of light propagation in optical fiber? Discuss with ray diagram	CO1	K1
c.	Discuss bending losses in optical fibers.	CO2	K1
d.	The input power to an optical fiber is 2 mW while the power measured at the output end is 2 µW. If the fiber attenuation is 0.5 dB/km, calculate the length of the fiber.	CO2	K2
e.	What is a fiber-optic connector?	CO3	K1
f.	Mention losses during coupling between source to fibers and fiber to fiber	CO3	K1
g.	State the lensing scheme for coupling improvement.	CO3	K1
h.	What are the light source materials?	CO4	K1
i.	What is SNR?	CO4	K2
j.	Draw the structure of LASER diode.	CO4	K1

PART – B   (10 x 5 = 50 Marks)

Answer *ANY FIVE* the questions

		Marks	CO#	Blooms Level
2.	Discuss the transmission of light through cylindrical wave guide by using electromagnetic theory.	10	CO1	K2
3.a	Discuss the application of optical fiber on FOCL.	6	CO1	K2
b.	Write short notes on Fiber optic cable	4	CO1	K1
4.a	What are fiber materials?	4	CO1	K1
b.	Describe the double crucible method for the fabrication of optical fiber materials.	6	CO1	K2
5.a	Explain in detail the different losses in optical fibers.	6	CO2	K1
b.	Discuss the design of optimization of single mode fibers.	4	CO2	K1
6.a	What is splicing? Discuss about fusion splices.	5	CO3	K1

b.	Two compatible multimode SI fibers are jointed with a lateral offset of 3 mm, an angular misalignment of the core axes by 3°, and a small air gap (but negligible end separation). If the core of each fiber has a refractive index of 1.48, relative refractive index differences of 2%, and a diameter of 100 mm, calculate the total insertion loss at the joint.	5	CO3	K2
7.a	What is a LED?	2	CO4	K1
b.	Mention its structure and types with neat diagram.	8	CO4	K2
8.a	What is an optical amplifier?	2	CO4	K1
b.	Discuss the structure and working of Rare Earth doped fiber amplifier.	8	CO4	K2

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