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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- VII (New) EXAMINATION – WINTER 2019

Subject Code: 2170312

Date: 03/12/2019

Subject Name: Medical Optics

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain Cone of Acceptance and Numerical Aperture.	03
	(b) Explain transverse electromagnetic modes.	04
	(c) Explain snell's law. Calculate angle of refraction for given values $n_1=1.51$, $n_2=1.50$, $\phi_1=39^\circ$.	07
Q.2	(a) Draw and explain a simple fiber optic system.	03
	(b) What is wavefront? Brief about Characteristics of wavefront. Also write equation for speed of light in the material.	04
	(c) Explain operation of LASER with proper schematics. Also give classification of LASER.	07
	OR	
	(c) Explain application of LASER in therapy.	07
Q.3	(a) Explain Micro bends.	03
	(b) What happens to the light if it approaches to the boundary at an angle less than critical angle? Explain total internal reflection.	04
	(c) Draw and explain Basic Endoscopic Imaging system.	07
	OR	
Q.3	(a) A light ray is traveling in a transparent material of refractive index 1.51 and approaches a second material of refractive index 1.50. Calculate the critical angle.	03
	(b) Compare different properties of ordinary light and LASER light.	04
	(c) Fiber optic Laser system in Neurosurgery	07
Q.4	(a) Explain types of scattering.	03
	(b) What happens to the light if it approaches to the boundary at an angle less than critical angle? Explain total internal reflection.	04
	(c) Explain the process of manufacturing of optical fiber.	07
	OR	
Q.4	(a) Write a note on Electromagnetic Spectrum.	03
	(b) Explain LASER lithotripsy.	04
	(c) Explain ophthalmological application of LASER.	07
Q.5	(a) Explain graded index fiber.	03
	(b) Explain effect of Dispersion on data transmission.	04
	(c) Enlist types of interaction occurs between LASER and tissue. Explain any two in detail	07
	OR	
Q.5	(a) Explain Fiber Optic Laser system in cardiovascular disease.	03
	(b) Explain LASER welding of tissue and LASER coagulation.	04
	(c) Explain Rayleigh scattering and Fresnel reflection.	07
