U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Electronics and Instrumentation Engineering **Duration: 3 hrs.**
Course Code: 19EI3PCLOI **Max Marks: 100**
Course: Laser and Optical Instrumentation

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	With the help of energy- level diagram and circuit diagram, explain the operating principle of Helium-Neon laser.	*CO2*	*PO1*	**10**
	b)	Explain in detail the different types of Q-switching techniques.	*CO2*	*PO1*	**10**
		OR			
2	a)	With the help of neat diagram explain the construction and working of Nd-YAG laser	*CO2* *CO3*	*PO1*	**10**
	b)	Explain frequency stabilization technique in laser and discuss how it is achieved in asymmetric power method.	*CO2* *CO3*	*PO1*	**10**
		UNIT-II			
3	a)	With necessary block diagram, describe the pulse echo technique of measuring large distances.	*CO2* *CO3*	*PO1*	**10**
	b)	With a neat sketch, explain laser welding process. Mention its advantages and limitations.	*CO2* *CO3*	*PO1*	**10**
		UNIT - III			
4	a)	Enumerate and discuss the various types of optical fibers and their properties.	*CO2* *CO3*	*PO1*	**10**
	b)	Describe Absorption losses and Scattering losses in an optical fiber.	*CO2*	*PO1*	**10**
		UNIT-IV			
5	a)	Differentiate between intrinsic and extrinsic fiber optic sensor. Explain phase modulation sensor working principle.	*CO2*	*PO1*	**10**
	b)	Discuss how fiber optic sensor can be employed to make the following measurements:	*CO2*	*PO1*	**10**

			(i) Current measurement (ii) Flow measurement			
			OR			
	6	a)	With the help of neat sketch, discuss the working principle of micro bend optical fiber sensors	*CO2* *CO3*	*PO1*	**10**
		b)	What is meant by integrated optics? Discuss any two integrated optics devices in detail.	*CO2* *CO3*	*PO1*	**10**
			UNIT - V			
	7	a)	With necessary schematic diagram, explain the method of measurement of current and strain in fiber optic instrumentation.	*CO4*	*PO1*	**10**
		b)	Discuss the interferometry method of measurement of liquid level in fiber optic instrumentation.	*CO4*	*PO1*	**10**

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