22PHP312N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2025
(Third Semester)

Branch - **PHYSICS**

PHOTONICS AND APPLICATIONS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	In absorption A +hv → ---- a) A b) A* c) v* d) hv*	K1	CO1
	2	Einstein coefficient for spontaneous emission is a) A_{12} b) A_{21} c) B_{12} d) B_{21}	K2	CO1
2	3	The intensity patterns of some of the lower order modes of a stable resonator cavity formed by ---- a) plane mirrors b) multilayer mirrors c) metallic mirrors d) spherical mirrors	K1	CO2
	4	If the pumping is increased beyond threshold, the gain at the oscillating frequency remains --- a) increased b) decreased c) fixed d) Zero	K2	CO2
3	5	In He-Ne laser -------- transition generates laser of Infrared beam of 33900A°. a) E6→ E5 b) E4 → E3 c) E6 → E3 d) E4 → E2	K1	CO3
	6	------- laser is not a gas laser. a) Excimer b) HF c) Xanthene d) Krypton	K2	CO3
4	7	Laser is used as a) a drilling bit b) a phonograph needle c) a saw to cut d) all the above	K1	CO4
	8	Holography is used in a) NDT b) aircraft tyre testing c) precise control of shape d) all the above	K2	CO4
5	9	The emission of light from material when bombarded by beam of high energy electron is called a) photoluminescence b) electroluminescence c) cathodeluminescence d) phosphorescence	K1	CO5
	10	CRT stands for--- a) Continuous Ray Transmission b) Cathode Ray Transmission c) Continuous Ray Tube d) Cathode Ray tube	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the theme of temporal coherence.	K2	CO1
		(OR)		
	11.b.	Enumerate Safety measures of laser.		
2	12.a.	What is meant by pumping? Explain optical pumping.	K2	CO2
		(OR)		
	12.b.	How the diffraction losses can be reduced when using spherical resonator?		
3	13.a.	Explain the construction and working of ruby laser.	K4	CO3
		(OR)		
	13.b.	Describe dye laser with energy level diagram.		
4	14.a.	Enumerate the applications of laser in industry.	K2	CO4
		(OR)		
	14.b.	Explain how holography used in computer memories?		
5	15.a.	What is meant by luminescence? Describe photoluminescence.	K2	CO5
		(OR)		
	15.b.	Explain interband radioactive recombination process with schematic energy level diagrams.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	What are Einstein Coefficients and obtain the relation between them?	K2	CO1
2	17	Deduce the rate equation of three level laser systems.	K2	CO2
3	18	Explain the principle, construction and working of CO_2 laser.	K4	CO3
4	19	Explain to measure the distance by interferometeric method.	K2	CO4
5	20	Illustrate the action of LCD display devices.	K2	CO5

Z-Z-Z END