

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2026
(Fourth Semester)

Branch - PHYSICS

OPTICS

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	Total internal reflection occurs when light travels from a a) Rarer to a denser medium b) Denser to a rarer medium c) Rarer to any medium d) Any medium to any medium	K1	CO1
	2	After passing through a convergent lens, the colour rays fail to converge at a certain location. This problem is known as a) Spherical aberration b) Distortion c) Coma d) Chromatic aberration	K2	CO1
2	3	What type of optical instrument is a Newtonian telescope? a) A refractor that uses lenses to focus light b) A reflector that uses a concave primary mirror and a secondary mirror to focus light c) A radio telescope that detects radio waves d) A refracting telescope that was invented by Newton	K1	CO2
	4	Epidiascope is used for ----- a) Projecting opaque objects b) Projecting pictures from a transparent slide c) Projecting film strip d) Projecting slide-cum-film	K2	CO2
3	5	Interference of light is evidence for that : a) The speed of light is very large b) light is a transverse wave c) light is electromagnetic in character d) Light is a wave phenomenon	K1	CO3
	6	What is the effective distance between the source of light and the screen in Fraunhofer Diffraction? a) Focal length of the convex lens b) Less than Focal Length of the convex lens c) Greater than the focal length of the convex lens and less than infinite d) Infinite	K2	CO3
4	7	In the Nicol prism Ordinary ray is eliminated by _____ a) Refraction b) Total internal reflection c) Dispersion d) Transmission	K1	CO4
	8	If a ray is incident at 45° on a quarter-wave plate, the emergent light is _____ a) Unpolarized b) Linearly Polarized c) Elliptically Polarized d) Circularly Polarized	K2	CO4
5	9	The technique by which image is obtained from a hologram is called as _____ a) Formation b) Construction c) Reconstruction d) Projection	K1	CO5
	10	What is the principle of fibre optical communication? a) Frequency modulation b) Population inversion c) Total internal reflection d) Doppler Effect	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks (5 × 7 = 35)

ALL questions carry EQUAL Marks (5 × 7 = 35)				
Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the laws of reflection and refraction?	K2	CO1
	(OR)			
	11.b.	Illustrate about spherical aberration in lens.		
2	12.a.	Construct a compound microscope with a neat diagram.	K3	CO2
	(OR)			
	12.b.	Build a Ramsden Eyepiece and find its equivalent focal length.		
3	13.a.	A thin equiconvex lens of focal length 4m and refractive index 1.50 rests on and in contact with an optical flat surface. Using a light of wavelength $5460\text{\AA}$, Newtons rings are viewed. Solve the diameter of the 5 th bright ring?	K3	CO3
	(OR)			
	13.b.	In Fraunhofer diffraction pattern due to a narrow slit a screen is placed 2m away from the lens to obtain the pattern. If the slit width is 0.2mm and the first minima lie 5mm on either sides of the central maximum. Solve the wavelength of light?		
4	14.a.	Analyze the construction and working of a Nicol prism.	K4	CO4
	(OR)			
	14.b.	Examine about Quarter wave plate and Half wave plate.		
5	15.a.	Infer the construction and reconstruction of the hologram.	K4	CO5
	(OR)			
	15.b.	Analyse the fibre optic communication system with a block diagram.		

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	Inspect about chromatic aberration in a lens and derive the expression for longitudinal chromatic aberration for an object at infinity.	K4	CO1
2	17	Examine the construction and working of constant deviation spectrometer with a neat diagram.	K4	CO2
3	18	Derive the expression for the optical path difference for interference due to reflected light in thin films and list the conditions for maxima and minima.	K4	CO3
4	19	Examine the construction and working of Laurent's halfshade polarimeter.	K4	CO4
5	20	Derive the expression for the acceptance angle and Numerical aperture of the fibre.	K4	CO5