Course Name: **Engineering Physics**

Course Outcome:

CO1. Understand phenomena of Interference, Diffraction, variation of Intensities in them, and their applications in daily life.

CO2. Discuss polarization of Light wave, double refraction, production and analysis of different polarized light waves and optical activity.

CO3. Understand fundamentals of Quantum mechanics, Schrodinger's wave equations to deal with physics problem.

CO4. Familiar with Maxwell equations and use them to study the Propagation of E-M waves in free space and conducting medium

CO5. Understand the principle and working of Lasers.

CO6. Familiar with mechanism of communication through Optical Fibre Cables and signal losses.

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Mid Term Examination, Odd Semester 2023-24
B.Tech. (Hons.) & B.Tech. (All CS_Specialization), I Year, I Semester
BPHS 1004: Engineering Physics

Time: 2 Hour **Maximum Marks: 30**

Read all the questions carefully.

Section – A

Attempt All Questions 3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Show that the interference phenomenon does not violate the law of conservation of energy.	3	1	An	F
2	In Fresnel's biprism experiment the angle of the glass prism is 3^0 and $\mu = 1.5$. Interference fringes are formed with source of wavelength 6000 Å located 10 cm from the biprism and source to screen distance is 100 cm. Find the maximum number of fringes that can be observed on the screen.	3	1	E	P
3	Plane polarised light of wavelength 6000 Å is incident on a thin quartz plate cut with faces parallel to the optic axis. Calculate: a. The ratio of the intensities of the ordinary and extraordinary light if the plane of vibration of the incident light makes an angle 30^0 with the optic axis. b. The minimum thickness of the plate which introduces a phase difference of π between the ordinary and extraordinary rays. Name the Retardation plate used. Given $\mu_O = 1.54$ and $\mu_E = 1.55$.	3	2	A	C
4	A doubly ionized He atom is accelerated through a potential of 100 Volts. Calculate the wavelength of matter wave associated with it.	3	3	U	C

5	An aircraft maintenance technician walks past a tall hangar door that acts like a single slit for sound entering the hangar. Outside the door, on a line perpendicular to the opening in the door, a jet engine makes a 680-Hz sound. At what angle with the door will the technician observe the first minimum in sound intensity if the vertical opening is 1.0 m wide and the speed of sound is 340 m/s?	3	1	A	C

Section – B

Attempt All Questions 5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	Express the condition of absent spectra/missing order in Grating Spectrum. (i)Find the missing orders in grating spectrum if the width of transparent and opaque regions of the grating becomes equal. (ii)Determine the highest order spectrum which may be seen with light of wavelength 6×10^{-5}cm by means of a grating with 5000 lines/cm?	5	1	A	C
7	Discuss mathematically the superposition of two plane polarized light waves having perpendicular vibrations. Show that plane polarized light and circularly polarized light are special cases of elliptically polarized light.	5	2	An	P
8	(i)The curved side of the plano-convex lens has radius of curvature R and rests on a flat glass surface of the same index of refraction in conventional Newton's ring experiment set-up. There is a medium of refractive index μ between the plano convex lens and the glass plate. The lens is illuminated from above by light of wavelength λ. Determine the diameter of dark rings in reflected light (D) in terms of λ, R and μ. (ii)In conventional Newton's ring experiment (reflected light) set-up, the central spot is found to be dark when the material of the used plano-convex lens and glass plate is same (crown glass; $\mu = 1.50$). Now, one of your friend claims that if you allow her to change the plano-convex lens and glass plate system, then the central spot will be bright. Discuss the plan of your friend that he/she could do for making the central spot appear bright from dark in reflected light.	5	1	E	C

Given Constants:

h (Planck's Constant)=6.63×10^{-34} J-sec; **q (charge on proton)=1.6×10^{-19} C**

m_o (rest mass of proton)=1.67×10^{-27} kg