Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)

B. Tech (First Semester - Regular) Examinations, January-2026

25FYBS10003– Applied Physics

(Aeronautical Engineering)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions

		CO #	Blooms Level
a.	Graphically show three types of damped harmonic oscillator along with their conditions of occurrence.	CO1	K1
b.	State Poynting theorem.	CO2	K1
c.	Write the full form of LASER & discuss its properties.	CO3	K2
d.	Write few technological applications of Superconductor.	CO4	K1
e.	Discuss the physical significance of quantum mechanical wave function.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

<u>Answer ***ALL*** the questions</u>

		Marks	CO #	Blooms Level
2. a.	Explain 'Superposition of waves' and its types? Derive an expression for resultant amplitude of two-wave superposition. Also discuss its different cases.	10	CO1	K1
	(OR)			
b.	Discuss with a neat diagram that how interference fringes are produced in Newton's Ring Experiment and derive the expression for the diameters of the dark and bright rings?	10	CO1	K1
3.a.	(i) Evaluate $\vec{\nabla}.\vec{F}$ where $\vec{F} = 2\hat{\imath}\,xy + 4\hat{\jmath}\,yz + 6\hat{k}\,zx$ (ii) Evaluate $\vec{\nabla} \times \vec{F}$ where $\vec{F} = x^2\hat{\imath} + y^2\hat{\jmath} - 2xyz\hat{k}$ (iii) State Gauss-divergence and Stokes theorem. (iv) Differentiate between conduction current and displacement current.	10	CO2	K2
	(OR)			
b.	Derive an expression for Maxwell wave equation in terms of electric field and magnetic field for a free space.	10	CO2	K2
4.a.	What is Miller Indices? Discuss the method to determine the Miller Indices of a crystal plane?	10	CO3	K1
	(OR)			
b.	State and Prove Braggs law of X-ray diffraction. Write the condition for X-ray diffraction of a crystal. X-ray of wavelength 2.4 Å is used to produce 2nd order diffraction for glancing angle 45^0, find the inter-planning spacing between the crystal planes.	10	CO3	K2
5.a.	Discuss Meissner effect. Differentiate between Type-1 and Type-2 superconductor.	7	CO4	K1

b.	Define Isotope effect. The critical temperature of Mercury metal with isotopic mass 199.5 amu is 4.195 K. What will be its critical temperature when isotopic mass increases to 203.4 amu?	3	CO4	K2
	(OR)			
c.	Differentiate between Diamagnetic, Paramagnetic and Ferromagnetic material with examples.	7	CO4	K1
d.	Define Superconductivity. Explain Meissner effect.	3	CO4	K1
6.a.	Explain Compton Scattering with suitable diagram. Discuss its different cases.	6	CO5	K2
b.	X-Ray of wave length $1.2A^0$ are scattered by carbon block at 60^0. Find out the Compton shift and wavelength of scattered photons.	4	CO5	K1
	(OR)			
c.	Explain Heisenberg's Uncertainty principle. Using it prove that microscopic particle electron is absent inside the nucleus.	10	CO5	K2

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