QP Code: R251A007 | Reg. No | | | | | | | | | | | AY 23

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

B. Tech (First Semester - Regular) Examinations, December 2025

25FYBS10003– Applied Physics

(Chemical, Civil, SE(AIML) and Mechanical)

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)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Define Quality factor.	CO1	K1
b.	Why magnetic monopole does not exist?	CO2	K1
c.	Write the full form of LASER & discuss its properties.	CO3	K1
d.	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?	CO4	K2
e.	Discuss the physical significance of quantum mechanical wave function.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Set up the differential equation for a Damped Harmonic Oscillator. Find the solution for the under damped oscillation. Graphically show three types of Damped Harmonic Oscillator along with their conditions of occurrence.	10	CO1	K1
	(OR)			
b.	Derive an expression for the diameters of dark and bright rings of Newton's Ring experiment. If the diameters of $(n+2)^{th}$ dark ring due to wavelength 5500 A^0 matches with $(n+5)^{th}$ dark rings due to wavelength 4500 A^0. If the radius of curvature of the Plano-convex lens is 2 m then find the diameter of $(n+10)^{th}$ dark ring due to wavelength 6500 A^0 ?	10	CO1	K2
3.a.	State and Prove Maxwell-Ampere circuital law.	8	CO2	K2
b.	State Gauss-divergence and Stokes theorem.	2	CO2	K1
	(OR)			
c.	Derive an expression for Maxwell wave equation in terms of electric field and magnetic field for a free space.	8	CO2	K2
d.	Write the unit and dimension of Poynting vector.	2	CO2	K1
4.a.	Sketch the block diagram of Fibre Optics Communication Link (FOCL) and explain its operation. A fibre has core and cladding index 1.68 & 1.5 respectively. Find the acceptance angle of the fibre.	7	CO3	K1
b.	Differentiate between Step index and Graded index optical fibres.	3	CO3	K1
	(OR)			

c.	Define reciprocal lattice. Derive an expression for Body Centred Cubic (BCC) crystal lattice with neat diagram.	10	CO3	K2
5.a.	Differentiate between Diamagnetic, Paramagnetic and Ferromagnetic material with examples.	7	CO4	K1
b.	Define Piezoelectricity, pyroelectricity and ferroelectricity with examples.	3	CO4	K2
	(OR)			
c.	Discuss Meissner effect. Differentiate between Type-1 and Type-2 superconductor.	7	CO4	K1
d.	Show that Superconductors behave as perfect diamagnetic materials ($\chi = -1$).	3	CO4	K2
6.a.	Explain Compton Scattering with suitable diagram? Discuss its different cases.	6	CO5	K1
b.	In a Photoelectric experiment, the threshold wavelength of tungsten cathode is $2500A^0$. Calculate the work function of the metal if it is irradiated by a light of wavelength 1500 A^0. Find the maximum kinetic energy of ejected electron.	4	CO5	K2
	(OR)			
c.	Explain Heisenberg's Uncertainty Principle? Using it prove that microscopic particle electron is absent inside the nucleus.	7	CO5	K1
d.	The wave function ψ of a system is a linear combination of Eigen functions ψ_1, ψ_2, ψ_3, ψ_4, and ψ_5. Find out the probability in the state given by $\boldsymbol{\Psi = \frac{1}{\sqrt{10}}\Psi_1 + \frac{1}{\sqrt{20}}\Psi_2 + \frac{1}{\sqrt{30}}\Psi_3 + \frac{1}{\sqrt{40}}\Psi_4 + \frac{1}{\sqrt{50}}\Psi_5}$	3	CO5	K2

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