GIET UNIVERSITY, GUNUPUR – 765022
B. Tech (Second Semester Regular) Examinations, May– 2024
23BBSBS10002 - Engineering Physics
(Common for all Branches)

Time: 3 hrs   Maximum: 60 Marks

(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.	What is SHM? Mention two examples.	CO1	K1
b.	State Faraday's law of electromagnetic induction.	CO2	K 2
c.	Discuss about displacement current.	CO3	K 2
d.	What is a dielectric material? Give examples.	CO4	K 1
e.	Mention the characteristics of quantum mechanical wave function?	CO6	K 1

PART – B   (10 x 5 = 50 Marks)

Answer **ALL** the questions

		Marks	CO #	Blooms Level
2. a.	Discuss with a neat diagram that how interference fringes are produced in Newton's Ring experiment. Mention its applications	7	CO1	K1
b.	In a Newton's Ring experiment, the diameters of 9th and 16th dark ring are 0.6cm and 1.5cm respectively. If the radius of curvature of the Plano convex lens is 100cm., then find the wavelength of the light?	3	CO1	K2
	(OR)			
c.	What is Damped harmonic oscillator? Derive the solution for the under damped oscillation.	6	CO1	K1
d.	What is quality factor? Find the velocity of longitudinal wave in a medium of density $\rho = 12\times10^3$ Kg/m^3 and bulk modulus B = 8×10^{11} N/m2	4	CO1	K1
3.a.	What is Poynting vector? State and explain Poynting theorem.	7	CO2	K2
b.	(i) Evaluate curl of the vector field, $B=2\hat{i}xy + 4\hat{j}yz + 5\hat{k}zx$ (ii) Calculate the gradient of the scalar field, $\varphi = x^3y + yz + x^2z^2$.	3	CO2	K1
	(OR)			
c.	Derive the electromagnetic wave equations for electric field and magnetic field in free space. What is the speed of em wave?	7	CO2	K1
d.	A point source emits light with power 260 W. Find the average value of the Poynting vector at a distance of 4 m from the source.	3	CO2	K1
4.a.	What are the methods to determine the Miller indices of a crystal plane? Find the Miller indices of a crystal plane having the intercepts 2a, 2b and 4c, where a, b and c are the crystal parameters.	6	CO3	K1
b.	Why X-ray is used for Bragg's experiment? 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?	4	CO3	K2
	(OR)			
c.	What is reciprocal lattice? Mention the properties of Reciprocal Lattice.	4	CO3	K1
d.	Derive an expression of a SC and BCC lattices?	6	CO3	K2

5a.	What is isotope effect? The critical temperature for mercury with an isotopic mass of 169.5u is 4.115K. Calculate its critical temperature when its isotopic mass changes to 179.4u. Compare between Type-I and Type-II superconductors.	6	CO4	K2
b.	Write different parts of optical fibre. In an optical fibre, the core material has refractive index 1.6 and refractive index of the cladding material is 1.3. What is the value numerical aperture?	4	CO5	K2

(OR)

c	Differentiate between Dia, Para, and ferro-magnetic material with examples?	4	CO5	K1
d	Sketch the block diagram of Fibre Optics Communication Link and explain its operation? A fibre has core and cladding index 1.68 & 1.5 respectively. Find the acceptance angle of the fibre?	6	CO5	K2
6.a.	State Heisenberg's Uncertainty principle. Using it prove the non-existence of electron in a Nucleus?	6	CO6	K1
b.	What is photoelectric effect? In a photoelectric experiment, the threshold wavelength of tungsten cathode is $5600A^0$. Calculate the work function of the metal if it is irradiated by a light of wavelength $4800 A^0$.	4	CO6	K2

(OR)

c.	Explain Compton Scattering with suitable diagram.? Discuss its different cases. Find the De Broglie's wavelength for an electron whose kinetic energy is 0.05ev.	6	CO6	K1
d.	Using Schrodinger's equation, discuss the case of a one-dimensional potential Step.	4	CO6	K1

--- End of Paper ---