ROLL NO: ☐☐☐☐☐☐☐☐☐☐

HI-TECH INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.TECH– Ist year

PUT SAMPLE PAPER 1,ODD-SEM, 2022-2023

ENGG PHYSICS

TIME: 3 HOURS   **TOTAL MARKS: 70**

		SECTION A (7X2=14)	
Q 1.	**Attempt ALL questions. The answers are expected to be in 50-75 words.**		
a.	What are phase velocity and group velocity.		CO1
b.	What is pointing vector?		CO2
c.	Why two independent light source neve be coherent?		CO3
d.	What do you mean by dispersive power of a Grating?		CO3
e.	What are population inversion and meta stable state.		CO4
f.	What is fibre loss in optical fiber.		CO4
g.	What is quantum dot (nano particle).		CO5
		SECTION B (3x7=21)	
NOTE:	**Attempt ANY four questions. The answers are expected to be in 100-200 words.**		
Q2	Calculate the de- Broglie wavelength of a neutron having kinetic energy of 1 ev.		CO1
Q3	Assuming that all the energy from a 1000 watt lamp is radiated uniformly. Calculate the average values of intensities of electric and magnetic fields of radiations at the distance of 2m from the lamp.		CO2
Q4	Newton's rings are observed by keeping a spherical surface of 100 cm radius on a plane glass plate. If the diameter of 15th bright ring is 0.590 cm and the diameter of the 5th ring is 0.336 cm, what is the wavelength of light used?		CO3
Q5	A step index fiber has core and cladding refractive indices 1.466 and 1.460 respectively. If the wavelength of light 0.85 μm is propagated through the fiber of core diameter 50 μm, find the normalized frequency and the number of mode supported by the fiber.		CO4
Q6	The critical field of niobium is 1×10^5 a/m at 8 K and 2×10^5 a/m at 0 K. Calculate the transition temperature of the element?		CO5
		SECTION C (5x7=35)	
NOTE:	**Attempt ANY five questions. The answers are expected to be in 100-200 words.**		
Q7	Attempt any **one** part.		
a.	Derive time independent and time dependent Schrodinger equation.		CO1
b.	Derive an expression for Compton shift showing dependency on angle of scattering.		CO1
Q 8	Attempt any **one** part.		
a.	Write the maxwell's equations. Show that the velocity of plane electromagnetic waves in the free space is given by $C = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$		CO2
b.	Explain the concept of Maxwell's displacement current and show how it leads to the modification of ampere's law.		CO2
Q9	Attempt any **one** part.		
a.	Draw a neat diagram of Ruby Laser and describe its working. What is its draw back? Discuss its important applications.		CO4
b.	Explain basic principle of optical fiber. Discuss types of fiber classification?		CO4
Q 10	Attempt any **one** part.		
a.	Describe and explain the formation Newton's rings. Prove that in reflected light, diameters of dark rings are proportional to the square root of natural numbers.		CO3
b.	Discuss the phenomenon of Fraunhofer diffraction at a single slit and show that the relative intensity of the successive maximum are nearly $1 : (4/9\pi^2) : (4/25\pi^2) : 4/49\pi^2$ and so on.		CO3
Q 12	Attempt any **one** part.		
a.	Describe Type I and Type II superconductors. Why are Type I supper conductors poor current carrying conductors.		CO5
b.	Describe different type nano-material. Explain the and formation of carbon Nano tube, their properties and application.		CO5