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HI-TECH INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.TECH – Ist year

PUT SAMPLE PAPER 2, ODD-SEM, 2022-2023

ENGG PHYSICS

TIME: 3 HOURS

TOTAL MARKS: 70

SECTION A		(7X2=14)
Q 1.	NOTE: Attempt ALL questions. The answers are expected to be in 50-75 words.	
a.	Define Poynting vector.	CO2
b.	What is Eigen value and Eigen function?	CO1
c.	What is coherent source of light?	CO3
d.	What do you mean by Missing order?	CO3
e.	What is the difference between spontaneous emission and stimulated emission of radiation.	CO4
f.	What is normalized frequency (V- number) in optical fibre.	CO4
g.	What is basic principle of Nano Science and Technology.	CO5
SECTION B		(3x7=21)
NOTE:	NOTE: Attempt ANY four questions. The answers are expected to be in 100-200 words.	
Q2	If the earth receives $2 \text{ cal min}^{-1} \text{ cm}^{-2}$ solar energy, what are the amplitudes of electric and magnetic field of radiation?	CO2
Q3	Calculate the De-Broglie wavelength of an α particle accelerated through a potential difference of 200 volts.	CO1
Q4	White light is incident on a soap film at an angle $\sin^{-1} 4/5$ and the reflected light is observed with a spectroscope. It is found that two consecutive dark bands correspond to wavelengths $6.1 \times 10^{-5} \text{ cm}$ and $6.0 \times 10^{-5} \text{ cm}$ respectively. If the refractive index of the film be $4/3$, calculate the thickness.	CO3
Q5	Calculate the Numerical aperture, acceptance angle and critical angle of the fibre from the following data: $\mu_1 = 1.50$ and $\mu_2 = 1.45$.	CO4
Q6	The transition temperature for lead is 7.26 K. The maximum critical field for the material is $8 \times 10^5 \text{ A/m}$. Lead has to use as a superconductor subjected to a magnetic field of $4 \times 10^4 \text{ A/m}$. What precaution will have to be taken?	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.	Show that the group velocity of the particle is equal to the velocity of particle. Also show that $V_p V_g = C^2$.	CO1
Q 8	Attempt any one part.	

a.	Deduce Poynting theorem for the flow of energy in an electromagnetic field and explain the physical significance of various terms involved in the equation.	C02
b.	Deduce Maxwell's equations for free space and prove that the electromagnetic waves are transverse.	C02
Q9	Attempt any one part.	
a.	Draw a neat diagram of Helium- neon Laser and describe its method of working. What are the characteristics of a Laser beam? Discuss its important applications.	C04
b.	Explain basic principle of optical fiber. Derive an expression of acceptance angle and Numerical aperture.	C04
Q 10	Attempt any one part.	
a.	Discuss the phenomena of interference of light due to thin films of uniform thickness in reflected light and find the conditions of maxima and minima.	C03
b.	Explain Rayleigh's criterion of resolution. Define limit of resolution and resolving power. Obtain an expression for resolving power of grating.	C03
Q 12	Attempt any one part.	
a.	Explain Meissner effect. Show that superconductor in superconducting state is a diamagnet.	C05
b.	Describe different type nano-material. Explain the and formation of Bucky ball and their properties.	C05