

Code No: P21BST02

R21

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)

I B.TECH I SEMESTER END REGULAR EXAMINATIONS, FEB - 2023

APPLIED PHYSICS

(Common to ECE,CSIT,IT,CSE(IOTCSBT),AIML Branches)

Time: 3 hours

Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.	Questions	Marks	CO	KL
UNIT-I				
1.	a) Describe and explain the phenomenon of interference of light. Discuss why two independent sources of light of the same wave length cannot produce interference fringes.	[4M]	1	2
	b) Prove that the diameters of the bright rings are proportional to the square root of odd natural numbers.	[10M]	1	3
OR				
2.	a) Explain the theory of Fraunhofer diffraction due to single slit. Derive the conditions for maxima and minima.	[7M]	1	2
	b) Derive an expression for the resolving power of a grating.	[7M]	1	2
UNIT-II				
3.	a) Explain the following (i) absorption, spontaneous emission and stimulated emission (ii) pumping mechanism and population inversion.	[7M]	2	2
	b) With the help of suitable diagrams, explain the construction and working of a Helium-Neon laser.	[7M]	2	2
OR				
4.	a) Explain the principle of an optical fiber. Define acceptance angle and numerical aperture.	[7M]	2	2
	b) Obtain mathematical expressions for acceptance angle and numerical aperture.	[7M]	2	2
UNIT-III				
5.	a) State and explain Coulombs law in electrostatics.	[7M]	3	2
	b) State and explain Gauss law in electrostatics.	[7M]	3	2
OR				
6.	a) Write down Maxwell equations for electromagnetic fields and explain what each equation represents.	[7M]	3	2
	b) State and prove Poynting theorem.	[7M]	3	3
UNIT-IV				
7.	a) Derive Schrodinger's time independent wave equation. What is the physical significance of wave function used in the above equation?	[7M]	4	2
	b) Explain the following terms: Drift Velocity, Mobility, Relaxation time, Effective mass and Bloch theorem	[7M]	4	2
OR				
8.	a) Discuss the Kronig-Penney model for the motion of an electron in a periodic potential	[10M]	4	3

	b)	Describe the formation of energy bands in solids and classify solids into conductors, semiconductors and insulators.	[4M]	4	2
UNIT-V					
9.	a)	Obtain an expression for the carrier concentration in an intrinsic semiconductor.	[7M]	5	2
	b)	What are mobility and drift current? Obtain Einstein's relation for doped semiconductors.	[7M]	5	2
OR					
10.	a)	What is Hall effect? Derive the expression for Hall coefficient and what are the applications of Hall effect.	[10M]	5	3
	b)	Derive an expression for the photoconductive gain of a photoconductive material with a neat sketch.	[4M]	5	2
