Code No: P18BST03

R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
I B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, FEB - 2023
APPLIED PHYSICS
(Common to ECE,CSE,CSIT,IT Branches)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q. No.		Questions	Marks	CO	KL
1	a)	What is the condition for diffraction	[2M]	1	2
	b)	Explain the law of refraction based on Snell's law.	[2M]	2	2
	c)	Mention the importance of pointing theorem in electromagnetic waves.	[2M]	3	2
	d)	Discuss the failures of classical free electron theory.	[2M]	4	2
	e)	Describe the working principle of Solar Cell.	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q. No.		Questions	Marks	CO	KL
		UNIT-I			
2.		With a neat experimental setup, Explain the principle and working of Newton's ring experiment. Derive the radius of curvature of given plano-convex lens using this experiment.	[10M]	1	5
		OR			
3.	a)	Differentiate Fraunhoffer and Fresnel diffraction with a neat sketch.	[4M]	1	2
	b)	What is grating? Derive the condition for maximum intensity in diffraction grating due to N slits.	[6M]	1	2
		UNIT-II			
4.	a)	Discuss construction and working of He-Ne laser system using energy level diagram.	[5M]	2	4
	b)	What is principle involved in the propagation of light through optical fiber. Derive the expression for numerical aperture of an optical fiber. Discuss its importance.	[5M]	2	2
		OR			
5.	a)	State and explain the different processes involved when radiation interacts with matter using energy level diagrams.	[6M]	2	3
	b)	Discuss the condition for population inversion. Mention the different methods to achieve population inversion.	[4M]	2	3
		UNIT-III			
6.		Discuss the importance of Maxwell's equations. Derive the Maxwell's equation in differential and integral from.	[10M]	3	3
		OR			
7.	a)	Explain the Coulomb's and Gauss law of electrostatics. Discuss their limitations.	[6M]	3	3
	b)	Differentiate the converge and divergence of electric field.	[4M]	3	3

UNIT-IV					
8.		Assuming Schrodinger wave equation, Derive the probability density function and energy of a particle enclosed in a potential well of infinite height for ground, first and second excited states.	[10M]	4	5
OR					
9.	a)	Discuss the importance of Fermi energy level. Prove that the energy levels above Fermi energy is empty and below energy levels are completely filled using Fermi-Dirac statistics.	[5M]	4	3
	b)	Explain the one dimensional movement of a particle in a periodic potential using Kronig-Penny model. Draw the assumptions and conclusions of this model.	[5M]	4	4
UNIT-V					
10.		Derive the density of electrons and holes in an intrinsic semiconductor. Prove that the Fermi level lies in the middle of the bandgap in intrinsic semiconductor.	[10M]	5	5
OR					
11.		State and Explain Hall effect with a neat sketch. How Hall coefficient determine the type of semiconductor. Derive the relation between Hall coefficient and Hall voltage. Mention the limitation and applications of Hall effect.	[10M]	5	5

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