VIDYA JYOTHI
INSTITUTE OF TECHNOLOGY
AN AUTONOMOUS INSTITUTION

R22

I B Tech II SEMESTER REGULAR & SUPPLEMENTARY EXAMINATION, JULY-2024

Subject: Applied Physics **Time: 3 hours**
Branch: CSE,AI,CSE(DS),CSE(AI&ML) & AI-DS **Max. Marks: 60**

Note: This Question Paper contains two Parts A and B. Answer all the questions.
- Part A is compulsory which carries 10 marks. Ten questions from five units.
- Part-B consists of 5 Questions (numbered from 11 to 15) carrying 10 marks each.

Bloom's Level:

Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

PART-A 10Q x 1M=10 Marks		Outcomes		B L	Marks
ANSWER ALL THE QUESTIONS		CO	PO		
1	What is interference?	1	1,2	L1	1M
2	What is double refraction?	1	1,1	L1	1M
3	Write notes on De Broglie wavelength.	2	1,1	L2	1M
4	Mention merits and demerits of Classical free electron theory.	2	1,1	L1	1M
5	Describe the concept of Fermi level in Semiconductors.	3	1,1	L2	1M
6	Draw the V-I Characteristics of a solar cell.	3	1,3	L3	1M
7	Define Nanotechnology.	4	1,1	L1	1M
8	Write types of bottom-up approach.	4	1,1	L1	1M
9	List any three applications of Lasers.	5	1,5	L3	1M
10	What is total internal reflection?	5	1,1	L1	1M
PART-B 5Q x 10M = 50M					
ANSWER ALL THE QUESTIONS					
11 i) a	Discuss about newton's ring experiment with the help of diagram and write conditions for constructive and destructive rings.	1	1,3	L3	5M
b	Write short notes on Nicol prism.	1	1,3	L3	5M
[OR]					
ii)	Describe Fraunhofer diffraction due to single slit.	1	1,1	L2	10M
12 i)	Estimate the energy of a particle limiting to one dimensional potential well.	2	1,3,5	L3	10M
[OR]					
ii) a	Explain Kronig-penny model and discuss its conclusions.	2	1,2	L1	6M
b	What is Bloch Theorem?	2	1,2	L3	4M
13 i)	What is LED? Explain the construction working and characteristics of LED.	3	1,1	L4	10M
[OR]					
ii) a	What is Photodiode? Discuss its construction, working and applications.	3	1,3	L1	7M
b	Calculate the energy gap when wavelength of light is 1.86×10^{-6}m.	3	1,3	L4	3M
14 i)	Explain the synthesis of nanomaterials using Sol-Gel method.	4	1,1	L3	10M
[OR]					
ii)	Explain in detail about Transmission Electron Microscopy (TEM).	4	1,1	L3	10M
15 i)	Derive the relation between three Einstein coefficients.	5	1,1	L5	10M
[OR]					
ii) a	Explain the different types of optical fiber, along with the refractive index profile and mode propagation sketches.	5	1,3	L3	7M
b	Find the fractional change in refractive index and numerical aperture for an optical fiber with refractive indices of core and cladding as 1.4 and 1.49 respectively.	5	1,3	L5	3M

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Aziznagar Gate, Chilkur Balaji Road, Hyderabad - 500 075. **Subject Code: A221002**

I B Tech I SEMESTER REGULAR & SUPPLEMENTARY EXAMINATION, FEBRUARY-2024

Subject: Applied Physics **Branch: CIVIL, EEE, MECH, ECE & IT**
Time: 3 hours **Max. Marks: 60**

Note: This Question Paper contains two Parts A and B. Answer all the questions.
- Part A is compulsory which carries 10 marks. Ten questions from five units.
- Part-B consists of 5 Questions (numbered from 11 to 15) carrying 10 marks each.

Bloom's Level:

Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

	PART-A 10Q x 1M=10 Marks	Outcomes		B L	Marks
		CO	PO		
	ANSWER ALL THE QUESTIONS				
1	Define diffraction.	1	1	L1	1M
2	What do you understand by polarization?	1	1	L1	1M
3	State Planck's radiation law.	2	1	L1	1M
4	Write any two merits of classical free electron theory.	2	1	L2	1M
5	What are intrinsic semiconductors?	3	1	L1	1M
6	State Hall effect.	3	3	L3	1M
7	What is Nano scale?	4	1	L1	1M
8	Write any two applications of nanomaterials.	4	1	L2	1M
9	What is population inversion in lasers?	5	1	L1	1M
10	Define total internal reflection.	5	1	L1	1M
	PART-B 5Q x 10M = 50 Marks				
	ANSWER ALL THE QUESTIONS				
11 i)	Discuss the interference phenomena in Newton's rings experiment and derive an expression to determine the radius of curvature of a plano convex lens.	1	1	L4	10M
	[OR]				
ii) a	Differentiate Fresnel and Fraunhoffer diffraction.	1	1	L2	7M
b	Write any three applications of polarization.	1	3	L3	3M
12 i) a	Explain de-Broglie hypothesis.	2	1	L2	3M
b	Derive an expression for energy levels of particle enclosed in one dimensional Potential box.	2	2	L3	7M
	[OR]				
ii) a	Write the conclusions of Kronig-Penny model with necessary graphs.	2	2	L2	7M
b	Explain classification of materials based on band theory of solids.	2	1	L2	3M
13 i) a	Differentiate direct and indirect band gap materials.	3	1	L2	4M
b	Explain V-I Characteristics to forward bias and reverse bias.	3	1	L2	6M
	[OR]				
ii)	Explain the principle, construction and working of LED.	3	2	L2	10M
14 i)	Describe the preparation of nanomaterials by using Sol-Gel method with a neat diagram.	4	1	L3	10M
	[OR]				
ii) a	Explain how surface to volume ratio varies in Nano materials compared to bulk materials with two examples?	4	1	L2	6M
b	Discuss quantum confinement in nanomaterials.	4	1	L4	4M
15 i) a	Explain the construction and operation of Ruby Laser.	5	1	L2	8M
b	Write any two applications of lasers.	5	1	L3	2M
	[OR]				
ii) a	Define the terms numerical aperture and acceptance angle of a fiber and derive expressions for them.	5	1	L2	7M
b	An optical fiber has a core material of refractive index of 1.55 and cladding material of refractive index of 1.50.The light is launched into it in air. Calculate its numerical aperture.	5	2	L3	3M

VJIT(A)

Remember		L1	Apply	L3	Evaluate	L5					
Understand		L2	Analyze	L4	Create	L6					

PART-A 10Q x 1M=10 Marks			Outcomes		Bloom's Level	Marks
ANSWER ALL THE QUESTIONS			CO	PO		
1	What is the Interference of light?		1	2	L2	1M
2	Define 'polarization' of light.		1	1	L1	1M
3	State de-Broglie hypothesis of matter waves.		2	4	L1	1M
4	Write any two drawbacks of classical free electron theory.		2	1	L2	1M
5	What are direct and indirect band-gap semiconductors?		3	3	L2	1M
6	Define 'Hall effect'.		3	5	L1	1M
7	How the surface to volume ratio increases with the decrease of size?		4	4	L3	1M
8	Write any two applications of nanomaterials.		4	5	L2	1M
9	What is population inversion?		5	1	L2	1M
10	State any two applications of optical fibers.		5	3	L1	1M

PART-B 5Q x 10M = 50Marks						
ANSWER ALL THE QUESTIONS						
11 i)	Discuss in detail about Fraunhofer diffraction due to single slit.		1	1	L4	10M
[OR]						
ii)	Explain in detail about the formation of Newton rings with suitable theory and neat diagram.		1	1	L2	10M
12 i)	Derive the Schroedinger's time independent wave equation and give the significance of wave function.		2	2	L6	10M
[OR]						
ii)	Explain the Kronig-Penny model for the motion of electron in a periodic potential along with conclusions.		2	2	L6	10M
13 i)	Describe the formation of PN junction with energy level diagram and explain I-V characteristics of PN junction diode.		3	1	L4	10M
[OR]						
ii)	Give a brief note on the principle, construction and working of LED.		3	5	L3	10M
14 i)	Explain the Chemical vapour Deposition method to synthesis nanomaterials.		4	2	L2	10M
[OR]						
ii)	Discuss the characterization of nanomaterials by TEM with neat block diagram.		4	3	L4	10M
15 i)	Explain the construction and working of He-Ne laser.		5	1	L2	10M
[OR]						
ii)	Differentiate Step- index and Graded-index optical fibers.		5	5	L4	10M

VJIT(A)