Subject Code: 20AP102BS	SET-I	HT NO:			7	R					

``CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. I Sem Supply End Examinations, January-2024

Applied Physics

Common to AIML, CSG, ECE, CSD

Time: 3 Hours **Max. Marks: 70**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	State Planck's law of black body radiation?	2	CO1	L1
	b	Distinguish between wave and particle	2	CO1	L4
	c	Differentiate intrinsic and extrinsic semiconductors.	2	CO2	L4
	d	What are the factors influencing the carrier concentration in n-type semiconductors?	2	CO2	L2
	e	Explain the phenomenon of interference of light	2	CO3	L2
	f	State principle of superposition of waves	2	CO3	L2
	g	State important characteristics of LASER beam	2	CO4	L1
	h	Write any two applications of optical fibers	2	CO4	L2
	i	Define (i) Magnetic Moment (ii) Magnetic Susceptibility	2	CO5	L1
	j	What is the piezoelectric effect?	2	CO5	L2

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Explain Davisson & Germer's experiment with neat diagrams and how it enables the verification of the wave nature of matter.	7	CO1	L2
	b	Write the significance of the wave function	3	CO1	L2
		OR			
3	a	Describe the Heisenberg uncertainty principle	5	CO1	L2
	b	Explain the wave-particle duality	5	CO1	L2
4	a	Illustrate the process of formation of a p-n junction	5	CO2	L2
	b	Explain forward and reverse basing in p-n Junction diode with V-I characteristic	5	CO2	L2
		OR			
5	a	Demonstrate construction and operation of Bipolar Junction transistor (BJT)	8	CO2	L2

Subject Code: 20AP102BS	SET-I	HT NO:			7	R					

	b	Write a short note on the Zener breakdown mechanisms.	2	CO2	L2
6	a	Obtain the condition for the principal maximum in Fraunhofer diffraction due to a single slit and derive an expression for the intensity of the maxima and minima.	8	CO3	L2
	b	How can you get multiple spectra using Grating?	2	CO3	L2
		OR			
7	a	What are the applications of the Michelson interferometer	2	CO3	L2
	b	Describe the construction and working of the Michelson interferometer. How can it be used for measuring the wavelength of monochromatic light?	8	CO3	L2
8	a	Explain the construction and working of the Ruby laser.	8	CO4	L2
	b	What are the application of ruby-laser	2	CO4	L2
		OR			
9	a	Explain the propagation of light through an optical fiber and deduce the expression for its numerical aperture	7	CO4	L2
	b	Calculate the numerical aperture and the acceptance angle of an optical fiber of refractive indices for core and cladding, which are 1.62 and 1.52, respectively.	3	CO4	L3
10	a	Discuss the hysteresis curve for a ferromagnetic material.	5	CO5	L2
	b	Differentiate soft and hard magnetic materials	5	CO5	L4
		OR			
11	a	Derive an expression for internal fields in solids.	8	CO5	L2
	b	Write short notes on ferroelectric materials	2	CO5	L2

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Subject Code: 20AP202BS	SET-II	HT NO:			7	R					

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. II Sem Supply End Examinations, January-2024

Applied Physics

Common to CSE, IT, CSM

Time: 3 Hours **Max. Marks: 70**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	Calculate the wavelength associated with an electron applied to a potential of 1600V	2	CO1	L3
	b	Write any two properties of the Particle.	2	CO1	L1
	c	Name two applications of PN junction diodes.	2	CO2	L1
	d	Define diffusion and drift currents	2	CO2	L1
	e	Write a short note on interference in thin film	2	CO3	L2
	f	State the Huygens principle	2	CO3	L1
	g	Compare spontaneous and stimulated emission.	2	CO4	L4
	h	What are the advantages of optical fibers compared to conventional coaxial cables?	2	CO4	L4
	i	Write any two applications of dielectric materials.	2	CO5	L2
	j	Define the susceptibility of magnetic materials	2	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Derive an expression for the time-independent Schrödinger's wave equation	7	CO1	L2
	b	Explain the de-Broglie hypothesis.	3	CO1	L2
		OR			
3	a	Explain the Particle in a 1-D potential box	8	CO1	L2
	b	An electron is confined to a one-dimensional potential well of width 1 × 10-10 m. Calculate the energies possessed by it in the first three energy levels.	2	CO1	L3
4	a	Derive an expression for the charge carrier concentration of intrinsic semiconductors.	6	CO2	L2
	b	Discuss the variation of Fermi level with carrier concentration and temperature	4	CO2	L2

Subject Code: 20AP102BS	SET-II	HT NO:			7	R					

OR

5	a	Explain the Hall effect and obtain expressions for the Hall voltage and Hall Coefficient.	8	CO2	L2
	b	Write applications of the Hall effect.	2	CO2	L2
6	a	Explain with theory and relevant diagram, Newton rings method to determine the wavelength of monochromatic light.	7	CO3	L2
	b	Write a short note on wave front splitting and amplitude splitting	3	CO3	L3

OR

7	a	State superposition of waves	2	CO3	L1
	b	Explain Fraunhofer diffraction due to double slit and derive an expression for the intensity of the maxima and minima.	8	CO3	L2
8	a	With the help of a suitable energy level diagram, explain the principle, construction, and working of a He-Ne laser.	8	CO4	L2
	b	Explain why the population inversion is required in a laser.	2	CO4	L2

OR

9	a	Distinguish between step index and graded index fibers.	7	CO4	L3
	b	Explain the structure of Optical fiber.	3	CO4	L1
10	a	Define Polarization in dielectric materials.	2	CO5	L1
	b	Derive the expression for Electronic and Ionic Polarizability in dielectric materials with suitable diagrams.	8	CO5	L2

OR

11	a	Differentiate Soft and Hard magnetic materials based on the hysteresis loop.	8	CO5	L4
	b	Write any two applications of magnetic materials	2	CO5	L2

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