PVP 23

Code: 23BS1203

I B.Tech - II Semester – Regular / Supplementary Examinations
MAY 2025

ENGINEERING PHYSICS
(Common for EEE, ECE, CSE)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	Describe the properties or characteristics of LASER.	L2	CO1
1.b)	State the basic principle used in optical fiber for transmission of light.	L1	CO1
1.c)	Establish a relation between the atomic radius(r) and the interatomic distance (a) for a Face centered cubic unit cell.	L3	CO3
1.d)	Illustrate any two applications of X-ray diffraction studies.	L3	CO3
1.e)	Develop the following relation $P= \varepsilon_0 (\varepsilon_r -1) E$.	L4	CO5
1.f)	Deduce the relation $B = \mu_0 (M+H)$.	L3	CO3
1.g)	Show that De-brogile wavelength $\lambda = h/P$.	L3	CO3
1.h)	Discuss the salient features of classical free electron Theory.	L3	CO3

1.i)	Illustrate the energy level diagrams for intrinsic and extrinsic (P-type, N-type) semiconductors.	L4	CO4
1.j)	List any two applications of Hall effect.	L1	CO1

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Demonstrate construction and working mechanism of He-Ne Laser with suitable diagram.	L3	CO2	6 M
	b)	Distinguish spontaneous and stimulated emissions.	L4	CO4	4 M
OR					
3	a)	Obtain an expression for numerical aperture of an optical fiber in terms of refractive indices of core and cladding.	L3	CO2	5 M
	b)	An optical fiber has the core and cladding refractive indices 1.45 and 1.44 respectively. Find the acceptance angle of optical fiber.	L4	CO4	5 M
UNIT-II					
4	a)	Show that FCC is the most closely packed of the three cubic structures by working out the packing fractions.	L3	CO3	6 M
	b)	Copper has FCC structure and the atomic radius is 0.1278nm. Calculate the inter planar spacing for (110) plane.	L4	CO5	4 M

		OR			
5	a)	Explain Bragg's law for the reinforcement of diffracted X-rays from a set of planes.	L4	CO5	4 M
	b)	Illustrate Laue's method with a neat diagram for the determination of crystal structure.	L3	CO3	6 M
		UNIT-III			
6	a)	Define the term relative permittivity. Derive an expression for Clausius-Mosotti equation.	L4	CO5	5 M
	b)	Discuss the Electronic polarization and derive the Electronic polarizability.	L3	CO3	5 M
		OR			
7	a)	Differentiate between hard and soft magnetic materials? Explain their applications.	L4	CO5	5 M
	b)	Explain the important features of ferromagnetic materials?	L3	CO3	5 M
		UNIT-IV			
8	a)	Derive Schrodinger's Time independent wave equation for a free particle of mass 'm' and energy 'E'.	L3	CO3	6 M
	b)	Calculate the De Broglie's wave length associated with a proton moving with a velocity of $1/10^{th}$ of velocity of light. (mass of proton = 1.67×10^{-27}kg).	L4	CO5	4 M
		OR			

9	a)	Explain the concept of density of states.	L3	CO3	2 M
	b)	Explain Fermi energy and Fermi Dirac distribution function. Illustrate the effect of temperature on the distribution.	L4	CO5	8 M
		UNIT-V			
10	a)	Derive an expression for the carrier concentration of P-type Extrinsic semiconductor.	L4	CO4	6 M
	b)	Explain Insulators, semiconductors, conductors according to origin of energy band theory.	L3	CO2	4 M
		OR			
11	a)	Define Hall effect. Derive an expression for the Hall coefficient.	L4	CO4	6 M
	b)	Explain Drift, Diffusion currents.	L3	CO2	4 M