49

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 3003

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – March/ April 2023

First Semester

Computer Science and Engineering

U19PH105 - ENGINEERING PHYSICS

(Computer Science and Technology, Information Technology and Biotechnology)

(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	State Hook's law of elasticity.	2	K1	CO1
2.	The stretching of a coil spring is determined by its shear modulus. Why?	2	K3	CO1
3.	Define density of states.	2	K1	CO2
4.	State Weidemann-Franz law.	2	K1	CO2
5.	Can we use copper rod in magnetostriction oscillator? Why.	2	K4	CO3
6.	Distinguish between unit cell and primitive cell.	2	K2	CO3
7.	Write the difference between n-type and p-type semiconductor.	2	K2	CO4
8.	Distinguish between one-way and two-way shape memory alloy.	2	K2	CO4
9.	For laser action to occur, the medium used must have at least three energy levels. Why?	2	K2	CO5
10.	Light coming from an optical fiber produces a spot of diameter 2 cm on a screen kept at a distance 25 cm away from the output end of the fiber. What is the numerical aperture of the optical fiber?	2	K5	CO5

PART – B

(5 x 16 = 80 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Deduce an expression for the couple to produce a unit twist in a long cylindrical wire fixed at one end. How it is used to determine rigidity modulus of a wire?	16	K3	CO1

(OR)

	b)	Derive an expression for the poiseuille's formula and describe an experiment to determine coefficient of viscosity of liquid.	16	K3	CO1
12.	a)	i. Derive an expression for Electrical conductivity and thermal conductivity of materials based on classical free electron theory.	12	K3	CO2
		ii. What are the merits and drawbacks of classical free electron theory?	4		
		(OR)			
	b)	i. Explain de-Broglie's wavelength in terms of accelerating potential associated with electrons.	8	K2	CO2
		ii. Explain Fermi-Dirac distribution function and how it various with temperature?	8	K2	
13.	a)	Describe a HCP structure. Show that for an HCP structure c/a =1.633 and hence calculate the packing factor for HCP structure.	16	K3	CO3
		(OR)			
	b)	i. Explain the production of ultrasonics by magnetostriction oscillator method.	12	K2	CO3
		ii. Discuss in detail how SONAR is employed to locate the object.	4	K2	
14.	a)	i. Derive an expression for the variation of Fermi level with temperature in p –type semiconductor.	8	K1	CO4
		ii. Calculate the intrinsic conductivity of Si at 300 K. μ_e = 0.135 $m^2V^{-1}s^{-1}$, μ_h = 0.135 $m^2V^{-1}s^{-1}$, E_g = 1.11 eV, $m_e^* = 0.26m_0$, $m_e^* = 0.39m_0$	8	K5	
		(OR)			
	b)	i. Explain how metallic glass is produced by melt spinning method.	10	K2	CO4
		ii. Discuss in detail the characteristics of shape memory alloys.	6	K2	
15.	a)	i. Derive an expression for the Einstein's A and B coefficents.	6	K3	CO5
		ii. Explain the principle, construction and working of Nd-YAG laser.	10	K2	
		(OR)			
	b)	i. What are the conditions to be satisfied for total internal reflection? Explain the types of optical fiber with suitable diagrams.	12	K1	CO5
		ii. Can glass and air act as core and cladding and produce total internal reflection for light propagating through it? Explain.	4	K2	