Enrollment No:_____

FACULTY OF ENGINEERING

B.E. Sem - Mid Semester Examination Summer 2025

Subject Name: Physics

Subject Code: 2010200103 **Date: 1-04-2025**

Total Marks: 40 **Time: 2.00pm-3.30pm**

Instructions:

1. **Attempt any FOUR questions out of FIVE questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**Answer the following.**	
(A)	Applicationss of I – shape girders	(2)
(B)	A wire of length 1 m extends by 1 mm when stretched by a load of 1 kg. Find the area of cross section of the wire. (Given Y = 2× 1011 N/m2 and g = 9.81 m/s2)	(3)
(C)	Draw: Stress – Strain diagram with necessary notation. Explain the main points of it.	(5)
Q.2	**Answer the following.**	
(A)	Explain various application of superconductor.	(2)
(B)	Calculate the critical current for a superconducting wire of lead having diameter 1.2 mm at 5.2 K. Critical temperature for lead is 8.12 K and H_0= 6.9 ×10⁵ A/m.	(3)
(C)	Discuss the properties of superconductors.	(5)
Q.3	**Answer the following.**	
(A)	Explain Josephson's Junction and its applications.	(2)
(B)	The critical temperature of Nb is 9.15 K. At zero Kelvin the critical field is 0.196 tesla. Calculate the critical field at 6K.	(3)
(C)	Write short note Ruby Laser with necessary diagram.	(5)
Q.4	**Answer the following.**	
(A)	Compare between spontaneous and stimulated emission.	(2)
(B)	Refractive index of core and cladding material are 1.54 and 1.5 respectively. Find the numerical aperture of a optical fiber.	(3)
(C)	Establish the relation between Einstein's coefficients.	(5)
Q.5	**Answer the following.**	

(A)	Explain Hook's Law and derive its unit.	(2)
(B)	An elastic rod having diameter of 30 mm, 10 cm long extends by 2.5 cm under tensile load of 28 kN. Find the stress, strain and the Young's modulus for the material of the rod.	(3)
(C)	Discuss the characteristics of LASER in detail.	(5)

**********Best of Luck**********