Reg. No.												

Question Paper Code	12466

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Second Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20BSPH206 - PHYSICS FOR INSTRUMENTATION ENGINEERING

(Regulations 2020)

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	Mention the drawbacks of classical free electron theory of metals.	*2,K1,CO1*
2.	State Wiedemann-Franz law.	*2,K1,CO1*
3.	What are the properties of semiconductors?	*2,K1,CO2*
4.	Given an extrinsic semiconductor, how will you find whether it is n-type or p-type?	*2,K2,CO2*
5.	Define critical temperature.	*2,K1,CO3*
6.	What is meant by isotope effect?	*2,K1,CO3*
7.	Classify magnetic materials based on their magnetic moments.	*2,K2,CO4*
8.	Differentiate soft and hard magnetic materials.	*2,K2,CO4*
9.	What are liquid crystal and its types?	*2,K1,CO5*
10.	What are 0D, 1D, 2D and 3D nanomaterials with an example?	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Define electrical conductivity? Derive an expression for electrical conductivity of a metal by using classical free electron theory.	*13,K2,CO1*
		OR	
	b)	Derive an expression for the density of states and based on that calculate the carrier concentration in metals.	*13,K2,CO1*
12.	a)	Derive an expression for density of electrons in the conduction band in an intrinsic semiconductor.	*13,K2,CO2*
		OR	
	b)	What is Hall effect? Obtain an expression for the Hall coefficient for a semiconductor with neat diagrams.	*13,K2,CO2*

13. a) (i) List out the differences between Type-I and Type-II superconductors. *10,K2,CO3*

(ii) Prove superconductors exhibit diamagnetism. *3,K2,CO3*

OR

b) Discuss the structure, properties and applications of high temperature superconductors with special reference to 1-2-3 superconductors. *13,K2,CO3*

14. a) Draw a B-H curve for a ferro magnetic material and identify retentive and coercive fields on the curve. *13,K2,CO4*

OR

b) Explain the structure of ferrites, properties and its applications. *13,K2,CO4*

15. a) List out different types of polarization mechanisms and also derive expressions for electronic and ionic polarization mechanisms in dielectric material. *13,K2,CO5*

OR

b) What is meant by local field in a dielectric? Explain how it is calculated for a cubic structure and deduce the Clausius - Mosotti relation. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) What are metallic glasses? Describe the preparation and properties and applications of metallic glasses. *15,K2,CO6*

OR

b) Explain the construction and working of liquid crystal displays with neat diagram. *15,K2,CO6*