Reg. No.																

Question Paper Code	14217

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Second Semester

Electronics and Instrumentation Engineering

20BSPH206 - PHYSICS FOR INSTRUMENTATION ENGINEERING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which material has 98% electrical conductivity? (a) Ag (b) Cu (c) Al (d) Fe	1	K1	CO1
2.	Which of the following factors affect the thermal conductivity? (a) Temperature (b) Phase change (c) Humidity (d) All of these	1	K1	CO1
3.	Which category of polarizability strongly depends on temperature and frequency? (a) Ionic Polarization (b) Electronic polarization (c) Orientation polarization (d) space charge polarization	1	K1	CO2
4.	The dielectric constant of a ferroelectric material changes with (a) Frequency (b) Temperature (c) Atmospheric pressure (d) Wavelength	1	K1	CO2
5.	In which of the following magnetic moment is zero? (a) Dia magnet (b) Parra magnet (c) Ferro magnet (d) Ferri magnet	1	K1	CO3
6.	When does a ferromagnetic material become paramagnetic material? (a) At Curie temperature (b) Below Curie temperature (c) Above Curie temperature (d) Never	1	K1	CO3
7.	Which one of the following is not an intrinsic semiconductor? (a) C (b) Si (c) Ge (d) Pb	1	K1	CO4
8.	What happens when a large value a.c. current is passed through superconductors? (a) Conductivity increases (b) Super conducting property is destroyed (c) Act as an magnet (d) It becomes resistor	1	K1	CO4
9.	Which one of the following is a metallic glass? (a) Argon (b) Krypton (c) Nickel (d) Gold	1	K1	CO5
10.	The metallic tubes have which kind of structure? (a) Armchair (b) Chiral (c) Boat (d) Achiral	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	The thermal and electrical conductivities of copper at 293 K are 380 $Wm^{-1}K^{-1}$ and 5.67 x 10^{-7} $\Omega^{-1}m^{-1}$ respectively. Calculate the Lorentz number.	2	K2	CO1
12.	Recall about tight binding approximation.	2	K1	CO1
13.	Define the term dielectric polarization.	2	K1	CO2
14.	What is meant by dielectric loss and what are the factors affecting dielectric loss?	2	K1	CO2
15.	Write short notes on quantum theory of paramagnetism.	2	K1	CO3
16.	Compare the soft and hard magnetic materials.	2	K2	CO3
17.	Write the applications of Hall effect.	2	K1	CO4
18.	What are Type-I and Type-II superconductors?	2	K1	CO4
19.	Classify the liquid crystals.	2	K2	CO5
20.	What is meant by glass transition temperature?	2	K1	CO5
21.	What are Anti ferromagnetic materials?	2	K1	CO3
22.	Interpret the postulates of classical free electron theory.	2	K2	CO1

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	(i)	Make use of free electron theory, obtain the expression for thermal conductivity.	7	K2	CO1
		(ii)	Interpret the failures of classical free electron theory.	4	K2	CO1
			OR			
	b)	(i)	Derive the expression for density of energy states.	7	K2	CO1
		(ii)	Outline the short notes on concept of hole.	4	K2	CO1
24.	a)		Explain the term local field and obtain the expression for the internal field in dielectric material.	11	K2	CO2
			OR			
	b)		Summarize piezoelectric, ferroelectric and pyroelectric materials and its applications.	11	K2	CO2
25.	a)		Compare dia, para, ferro and ferri magnetic materials.	11	K2	CO3
			OR			
	b)		Illustrate the recording mechanism in floppy disk and CD-ROM.	11	K2	CO3
26.	a)		Interpret the expression for density of electron and holes in intrinsic semiconductor.	11	K3	CO4
			OR			
	b)		Explain in detail about Meissner effect and high Tc superconductors.	11	K3	CO4
27.	a)		Infer the applications of liquid crystals in display devices.	11	K2	CO5
			OR			
	b)		Interpret the properties and applications of CNT.	11	K2	CO5
28.	a)		Explain the domain theory of hysteresis and quantum theory of ferromagnetism.	11	K2	CO3
			OR			
	b)		Illustrate the structure and properties of ferrites.	11	K2	CO3