Question Paper Code	11743

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022
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.	Define electrical conductivity along with its unit.	2,K1,CO1
2.	Differentiate between degenerate and non degenerate state.	2,K2,CO1
3.	Write down any four general properties of dielectric materials.	2,K1,CO2
4.	What is polarization in dielectrics?	2,K1,CO2
5.	What is meant by piezoelectric and inverse piezoelectric effect?	2,K1,CO3
6.	What are ferrites? Give examples.	2,K1,CO3
7.	Write the various processes involved in domain growth.	2,K1,CO4
8.	What are the types of magnetic storage devices?	2,K1,CO4
9.	State density of charge carriers.	2,K1,CO5
10.	What is AC Josephson effect?	2,K1,CO5

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11	a)	Explain the stages of free electron theory of solids and discuss in detail about classical free electron theory of metals along with its postulates.	13,K2,CO1

OR

	b)	What is Fermi-Dirac distribution function? Discuss the effect of temperature on Fermi-Dirac distribution function with neat graph.	13,K2,CO1

12.	a)	Obtain an expression for internal field expression using Lorentz method and hence deduce the Clausius –Mosotti Equation.	13,K2,CO2

OR

	b)	Describe in detail about different types of polarization mechanisms in dielectrics.	13,K2,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) Derive the expression for dielectric loss and list out any four factors affecting dielectric loss. *13,K2,CO3*

OR

b) With neat diagrams, explain Piezoelectric, Ferroelectric and pyroeletric materials. Also list any two applications of each material. *13,K2,CO3*

14. a) Explain the domain theory of ferromagnetism .Using that, explain in detail the phenomenon of hysteresis in ferromagnetic materials. *13,K2,CO4*

OR

b) Describe the classification of magnetic materials based on magnetic dipoles. *13,K2,CO4*

15. a) Derive an expression for carrier concentration in intrinsic semiconductor. *13,K2,CO5*

OR

b) Derive an expression for Hall coefficient for an n-type and p-type semiconductor. Describe an experiment for measurement of the Hall coefficient and mentions its applications. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Give a detailed account of metallic glasses, their method of preparation, types, properties and applications. *15,K2,CO6*

OR

b) (i) How nanomaterials are classified based on their dimensions? *5,K2,CO6*

(ii) Explain in detail about the structure and classifications of carbon nanotubes. Also, list out any three of its properties and applications. *10,K2,CO6*