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Question Paper Code : 30081

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Second Semester

Electrical and Computer Engineering

PH25C04 — APPLIED PHYSICS (EE) — II

(Common to : Electrical and Electronics Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2025)

Time : 3 hours

Maximum : 100 marks

CO – Course Outcomes

CO1	Explain the concepts of physics in electrical engineering stream.
CO2	Apply appropriate techniques in physics to solve engineering problems.
CO3	Analyse physical systems and interpret data from the virtual studies in the core branches in electrical engineering.

BL – Bloom's Taxonomy Levels

(L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create)

Answer ALL questions.

PART – A (Total Marks = 40)

[Q. No. 1 to Q. No. 10 ; $10 \times 1 = 10$ Marks (Multiple Choice Questions)]

Q. No. 11 to Q. No. 20; $10 \times 3 = 30$ Marks]

Q.No.	Questions	Marks	CO	BL
1.	How does a semiconductor behave at absolute zero? (A) Conductor (B) Insulator (C) Partially Insulator (D) Partially Conductor	1	1	1
2.	What are the charge carriers in semiconductors? (A) Electrons and holes (B) Electrons (C) Holes (D) Charges	1	1	1

3.	How are charge carriers produced in intrinsic Semiconductors? (A) By pure atoms (B) By electrons (C) By impure atoms (D) By holes	1	1	1
4.	Dielectrics which show Spontaneous polarization are called as (A) Pyroelectric (B) Piezoelectric (C) Ferroelectric (D) Centrosymmetric	1	2	1
5.	Electrical counterpart of bar magnets are called as (A) Ceramics (B) Electrical Magnets (C) Electrets (D) Electrostriction	1	2	1
6.	Which gas is used for insulation? (A) N ₂ (B) O ₂ (C) CO (D) CO ₂	1	2	1
7.	If a material is ferromagnetic, what shall be the value of X? (A) Negative (B) Small and positive (C) Large and Positive (D) Insufficient information	1	3	1
8.	Materials in which magnetization persists even after the field has been removed are called (A) Diamagnetic (B) Paramagnetic (C) Soft Ferro magnets (D) Hard Ferro magnets	1	3	1
9.	Which describes current flow between two junctions formed by two different metals? (A) Peltier effect (B) Thomson effect (C) Seebeck effect (D) Joules effect	1	3	1
10.	Which of the following element is used as a thermocouple in nuclear reactor? (A) Boron (B) Platinum (C) Copper (D) Iron	1	3	1

11.	What do you mean by recombination? Mention its application.	3	1	2
12.	What is fermi level?	3	1	2
13.	Define polarization.	3	2	2
14.	What is ferroelectric material? Give an example.	3	2	2
15.	Differentiate between hard and soft magnetic materials.	3	3	2
16.	State the principle of GMR sensor.	3	3	2
17.	Write the properties of ferromagnetic materials.	3	3	2
18.	Define dielectric permittivity. Give its unit.	3	2	2
19.	Give the classification of thermocouples.	3	3	2
20.	List any three examples for fuse materials.	3	3	2

PART – B (5 × 12 = 60 marks)

Q.No.		Questions	Marks	CO	BL
21.	(a)	Derive the carrier concentration of intrinsic semiconductor.	12	1	3
	OR				
	(b)	Explain the Hall effect and obtain an expression for Hall voltage and coefficient for P type semiconductor.	12	1	4
22.	(a)	Derive the expression for the local field in a dielectric material and obtain the Clausis-Mosatti relation with significance.	12	2	4
	OR				
	(b)	Explain the electronic and ionic polarization in dielectrics and compare their characteristics.	12	2	3

23.	(a)	Explain the phenomenon of Hysteresis using B-H Curve for a ferromagnetic Material.	12	3	3
	OR				
	(b)	Describe the structure, properties and applications of ferrites in detail.	12	3	3
24.	(a)	Discuss the theory of bimetals formation and explain how does bimetals act as thermostats with a neat sketch.	12	3	4
	OR				
	(b)	Elaborate the principle, construction and working of a thermocouple.	12	3	3
25.	(a)	(i) Explain the properties of Piezoelectric materials.	6	2	3
		(ii) Explain the role of dielectric materials in transformers.	6		
	OR				
	(b)	(i) Explain the variation of fermi level with temperature in extrinsic Semiconductors.	6	2	4
		(ii) Explain the factors affecting the dielectric loss.	6		