

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Third Semester)

Branch – PHYSICS

ELECTRICITY AND MAGNETISM

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No	Question No	Question	K Level	CO
1	1	The electric field at a point inside a charged sphere of conducting material is (i) Zero (ii) Constant and Non-zero (iii) Dependent on distance from the centre (iv) Dependent on the charge and radius of the conductor	K1	CO1
	2	Gauss's law in differential form for a dielectric medium is expressed as: (i) $\nabla \cdot \mathbf{E} = \rho_f$ (ii) $\nabla \cdot \mathbf{D} = \rho_f$ (iii) $\nabla \cdot \mathbf{D} = \rho_f + \rho_b$ (iv) $\nabla \cdot \mathbf{D} = 0$	K2	CO1
2	3	The SI unit of current density is (i) $A \cdot m$ (ii) A/m (iii) A/m^2 (iv) C/m^2	K1	CO2
	4	The potential gradient along a potentiometer wire depends on (i) Only the current flowing through the wire. (ii) Only the resistance per unit length of the wire. (iii) Both the current and the resistance per unit length. (iv) The EMF of the cell being measured.	K2	CO2
3	5	If the current through an electrolyte is doubled and the time is halved, the mass deposited will (i) Double (ii) Quadruple (iii) Remain the same (iv) Become one-fourth	K1	CO3
	6	The temperature at which the thermo-EMF of a thermocouple becomes maximum is called (i) Temperature of inversion (ii) Neutral temperature (iii) Absolute temperature (iv) Curie temperature	K2	CO3
4	7	The RMS value of an alternating current is defined as that steady current which produces (i) The same magnetic effect as the AC (ii) The same chemical effect as the AC (iii) The same heating effect as the AC in a given resistance (iv) The same peak voltage as the AC	K1	CO4
	8	The Quality Factor (Q-factor) of a series resonant circuit is given by (i) $R/\omega L$ (ii) $\omega L/R$ (iii) $1/\sqrt{LC}$ (iv) $R\sqrt{LC}$	K2	CO4
5	9	For a Ferromagnetic material, the magnetic susceptibility is (i) Small and negative (ii) Small and positive (iii) Large and positive (iv) Zero	K1	CO5
	10	Ampere's Circuital Law is analogous to which electrostatic law? (i) Coulomb's Law (ii) Gauss's Law (iii) Ohm's Law (iv) Faraday's Law	K2	CO5

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SECTION-A (35 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 × 7 = 35)

Module No	Question No	Question	K Level	CO
1	11.a.	Explain Gauss's theorem and find the electric field due to a charged infinite plane sheet.	K2	CO1
		(OR)		
	11.b.	Illustrate the relation connecting Electric Field and Electric Potential.	K2	
2	12.a.	Identify the Equation of Continuity.	K3	CO2
		(OR)		
	12.b.	Construct the Working Principle of Potentiometer and its uses.	K3	
3	13.a.	Simplify the Faraday's Laws of Electrolysis.	K4	CO3
		(OR)		
	13.b.	Distinguish between Seebeck and Peltier effect.	K4	
4	14.a.	Illustrate the expression for Peak, Average and RMS value of Alternating Current.	K3	CO4
		(OR)		
	14.b.	Interpret the Growth and Decay of Current in LR Circuits.	K3	
5	15.a.	List out the Properties of Dia, Para and Ferro Magnetic Materials.	K1	CO5
		(OR)		
	15.b.	What is Hysteresis and identify the area of Hysteresis curve represent?	K1	

SECTION-A (30 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(3 × 10 = 30)

Module No	Question No	Question	K Level	CO
1	16.	Develop the Relation between D, E and P.	K3	CO1
2	17.	Explain with necessary theory how a small resistance can be measured with a Carey Foster's Bridge.	K2	CO2
3	18.	Construct the experimental method and to determine the thermo-emf of a thermocouple.	K5	CO3
4	19.	Analyze the LCR series resonance circuit with necessary theory.	K4	CO4
5	20.	Explain the Langevin theory of i) Dia Magnetism and ii) Para Magnetism.	K2	CO5

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END