QP Code: R252G028 | Reg. No | | | | | | | | | | | AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

M.Sc. (Second Semester - Regular) Examinations, July – 2025

24MPHPC12001– CLASSICAL ELECTRODYNAMICS

(Physics)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. Why magnetic monopole does not exist.	CO1	K1
b. Discuss the behaviour of plasma in Uniform B, E = 0.	CO2	K2
c. What is magnetic pinch effect in plasma?	CO3	K1
d. Write the conditions for an ionized gas to be called as plasma.	CO4	K1
e. Explain about four vectors.	CO5	K1

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a. Discuss the boundary condition for normal component of B & D, tangential component of E at the interface between two media. Show that tangential component of H is continuous at the media interface.	10	CO1	K1
(OR)			
b. Derive the Maxwell electromagnetic wave equations in terms of electric field and magnetic field in charge free conducting medium.	10	CO1	K2
3.a. Discuss how electrical neutrality is maintained in plasma even if an external charge is introduced into it. Obtain an expression for Debye's screening distance.	10	CO1	K1
(OR)			
b. Derive the expression for scattering cross section for Thomson's scattering. Discuss the information obtained from Thomson's scattering.	10	CO2	K2
4.a. Discuss in detail about the absorption of radiation by an oscillator.	6	CO3	K1
b. Define scattering cross-sections. What is the condition for resonant scattering?	4	CO3	K1
(OR)			
c. Explain Rayleigh scattering on the basis of scattering of electromagnetic waves by bound electrons.	10	CO3	K2
5.a. Discuss quasineutrality of plasma and hence explain Debye length.	10	CO4	K2
(OR)			
b. Discuss the behaviour of plasma in (i) non-uniform B, E = 0 and (ii) in presence of both electric and magnetic field.	10	CO4	K2
6.a. What is magnetic confinement in plasma? Discuss the instabilities in a pinched plasma column.	10	CO5	K2
(OR)			
b. Derive Maxwell's field equation in terms of four vectors.	6	CO5	K2
d. Discuss in detail electromagnetic potentials.	4	CO5	K1

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