

Reg.No.									
---------	--	--	--	--	--	--	--	--	--

DEPARTMENT OF SCIENCES, III SEMESTER M.Sc. (PHYSICS) END SEMESTER MAKEUP EXAMINATIONS, DEC 2023 Electromagnetic Theory [PHY 6102]

(CHOICE BASED CREDIT SYSTEM - 2020)

Time: 3 Hours

Date: 28/12/2023

MAX. MARKS: 50

Note (i) Answer ALL questions

(ii) Draw diagrams, and write equations wherever necessary

Q No	Question	Marks	CO	BL
1A	Quantitatively elucidate the classical image problem.	05	01	03
1B	Derive the expression for divergence of an electrostatic field.	02	01	03
1C	What is Poisson's equation? Under what conditions it takes the form of	03	01	02
2A	Derive the potential of an arbitrary localized charge distribution.	04	01	03
2B	Elucidate Gauss's law in the presence of dielectrics.	04	01	03
2C	Qualitatively describe the effect of a magnetic field on atomic orbits.	02	01	04
3A	Derive the expression for energy in magnetic field.	04	02	03
3B	Elucidate the potential formulations in electrodynamics.	03	02	03
3C	Explain how Maxwell fixed up Ampere's law.	03	02	01
4A	Let an incoming EM wave meets the boundary between two media at a			
	glancing angle, θ_{I} . Derive the expressions for reflection and transmission	05	03	03
	coefficients.			
4B	Derive the expression for energy and momentum of EM waves in vacuum.	03	03	03
4C	Deliberate the frequency dependence of skin depth in case of EM waves	02	02	02
	traveling in conductors.	02	03	03
5A	Consider two tiny metal spheres separated by a distance s and connected			
	by a fine wire. Assume that the system as a whole is electrically neutral;	05	03	03
	derive the expression for Poynting vector.			
5B	Explain the conception of Lienard- Wiechert potentials.	03	03	03
5C	Find the potential of a point charge moving with constant velocity.	02	03	02
