BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MSC/IMSC **SEMESTER : I/VII**
BRANCH: PHYSICS **SESSION : MO/2023**

SUBJECT: PH402 ELECTRODYNAMICS

TIME: 3 HOURS **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Develop the expression for the force exerted on a dipole of moment **p** placed in a non-uniform electric field **E**.	[5]	[1]	[3]
Q.1(b)	In an electric field the electric potential is given by U (x,y,z) = $(4x^2+3y^2+9z^2)^{-1/2}$. Find the electric field at point (1 1 1).	[5]	[1]	[1]
Q.2(a)	Explain dielectric polarization and electric displacement?	[5]	[2]	[2]
Q.2(b)	A sample of gold having magnetic susceptibility -3.6×10^{-5} is placed in a magnetizing field of strength 60×10^3 A. turn/m. Find the magnetic induction within the sample.	[5]	[2]	[1]
Q.3(a)	Find the law of conservation of charge from Maxwell's field equation.	[5]	[3]	[1]
Q.3(b)	Determine the equation of electromagnetic wave in a medium having finite permittivity ε and permeability μ but the conductivity σ=0.	[5]	[3]	[5]
Q.4(a)	If earth receives 2 cal $min^{-1}cm^{-2}$ solar energy, what are the amplitudes of electric and magnetic field of radiation?	[5]	[4]	[1]
Q.4(b)	Discuss the phenomenon of reflection of em wave at a boundary for normal incidence.	[5]	[4]	[6]
Q.5(a)	Develop the expression for the magnetic vector and scalar potential for oscillating electric dipole.	[5]	[5]	[3]
Q.5(b)	What is Leonard Wiechert potentials? Discuss its physical significance.	[5]	[5]	[6]

:::::24/11/2023 E:::::