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

CLASS: B.Sc. **SEMESTER : I**
BRANCH: CHEMISTRY **SESSION : MO/2025**

SUBJECT: PH109 PHYSICS-I

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)	Estimate the electric field inside and outside of a uniformly charged sphere.	[5]	1	3
Q.1(b)	Find out the expression for energy density in an electric field	[5]	1	3
Q.2(a)	Find the boundary condition between B and H for normal component.	[5]	2	3
Q.2(b)	Write the general form of Maxwell's Equation.	[5]	2	2
Q.3(a)	Write the empirical formula for Liquid drop model. Derive the Volume energy term of the expression.	[5]	3	3
Q.3(b)	What is the nuclear fusion and fission? Find the energy needed to remove a neutron from the nucleus of the calcium isotope $^{42}Ca_{20}$.	[5]	3	2
Q.4(a)	Write the necessary conditions for the Interference. What is constructive and destructive interference? write its conditions also.	[5]	4	2
Q.4(b)	State the Brewster's Law along with appropriate figure. An unpolarized light of intensity (I_0) passes through three successive polarizers P_1, P_2, and P_3. Polarization axes of P_1 make an angle 60° with P_2 and P_2 makes angle 30° with P_3. Calculate he corresponding intensity outcomes from P_1, P_2 and P_3.	[5]	4	3
Q.5(a)	Write the expressions of Lorentz Transformation.	[2]	5	2
Q.5(b)	Derive relationship between energy and momentum.	[3]	5	2
Q.5(c)	What is length contraction? Derive the suitable expression. At what speed does a meter stick move if its length is observed to shrink to 0.5 m?	[5]	5	3

::::::21/11/2025::::::E