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

CLASS: BTech **SEMESTER : II**
BRANCH: CSE/AIML/ECE/EEE **SESSION : SP/2023**

SUBJECT: PH113 PHYSICS

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 intensity distribution formula due to double slit Fraunhofer diffraction.	[5]	1	3
Q.1(b)	Evaluate the half angular width of the central maximum in the Fraunhofer diffraction pattern of a slit of width 12×10^{-5} cm when the slit is illuminated by monochromatic light of wavelength 6000Å.	[5]	1	5
Q.2(a)	Show that the electrostatic field E is conservative in nature.	[5]	2	2
Q.2(b)	Explain continuity equation. How it is used to modify the Ampere's law.	[5]	2	5
Q.3(a)	Find the relativistic formula for addition of velocities.	[5]	3	1
Q.3(b)	The mass of a moving electron is 11 times its rest mass. Find the relativistic values of kinetic energy and momentum.	[5]	3	1
Q.4(a)	Find an expression for Compton shift when X-rays being scattered by a free electron.	[5]	4	1
Q.4(b)	Develop the time independent form of Schrödinger's wave equation.	[5]	4	6
Q.5(a)	Explain the working principle of a three-level laser system with suitable energy level diagram. Why lasing is not possible in a two-level system?	[5]	5	2
Q.5(b)	Develop mathematical expressions for Einstein's A and B coefficients, and also discuss their physical significance.	[5]	5	6

:::::18/07/2023:::::