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

CLASS:	IMSC	SEMESTER : II
BRANCH:	PHYSICS	SESSION : SP/2023

SUBJECT: PH106 WAVES AND OPTICS

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)	Explain the theory of the superposition of two collinear oscillations having same frequency but different amplitudes.	[5]	1	1
Q.1(b)	Sketch and explain the Lissajous figures with equal and four unequal frequencies, qualitatively.	[5]		
Q.2(a)	Develop the equation of velocity of longitudinal waves in a fluid enclosed in a pipe of infinite length.	[7]	2	6
Q.2(b)	The fundamental frequency of a closed organ pipe is of frequency 60 Hz. What will be the fundamental frequency of an open organ pipe of same length?	[3]		
Q.3(a)	Devise an expression for the wavelength of the incident monochromatic light by observing from the reflected side of Newton's rings arrangement.	[7]	3	4
Q.3(b)	In a Newton's rings arrangement, if a plano-convex lens of radius 100 cm is placed on an optically flat glass plate and is illuminated by monochromatic light. The diameter of the 10th dark ring, observed from the reflected side, is 0.72 cm. Calculate the wavelength of the light used.	[3]		
Q.4(a)	Illustrate the intensity pattern of the single slit Fraunhofer diffraction with suitable expressions and neat diagrams (without derivation).	[6]	4	4
Q.4(b)	Give the idea of forming fringes using Michelson Interferometer.	[4]		
Q.5(a)	Summarize three methods of obtaining polarized light.	[6]	5	2
Q.5(b)	State and explain Malus law.	[4]		

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