



B.Sc. III Semester Degree Examination, March/April - 2023

PHYSICS

03 : Wave Motion and Optics

(NEP)

Time : 2 Hours

Maximum Marks : 60

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- Note :** (i) Answer **all** the Sections.
(ii) Non-programmed Scientific calculators are allowed.
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SECTION - A

1. Answer the following sub-questions each sub-question carries **one** mark. **10x1=10**
- What are progressive waves ?
 - State the principle of Superposition of waves.
 - What is end correction ?
 - Define Reverberation time.
 - What is Fresnel's biprism ?
 - What is thin film ?
 - On what factors resolving power of a grating depends.
 - What is the condition for minimum intensity by a circular aperture in fresnel diffraction ?
 - What is optical activity ?
 - Define Stimulated emission.

SECTION - B

Answer **any four** of the following questions each question carries **five** marks. **4x5=20**

- Write any five applications of beats.
- Differentiate between progressive wave and standing wave.
- Derive an expression for fringe width in an interference pattern of Young's double slit experiment.
- Define resolving power of a grating and obtain an expression for it.
- Describe the method of producing plane polarised light by reflection.
- Distinguish between Zone plate and a Convex lens.



SECTION - C

Answer **any three** of the following questions each question carries **ten** marks. **3x10=30**

8. (a) Derive Newton's formula for velocity of sound. Discuss laplace correction for Newton's formula. **7+3**
(b) Write any three uses of Lissajous figures.
9. (a) Derive the expression for Sabine's formula. **5+5**
(b) Obtain the expression for normal modes of the string.
10. (a) Give the theory of Newton's rings by reflected light. **5+5**
(b) Explain Huygen's theory and concept of wavefront.
11. (a) Describe Fraunhofer diffraction due to a single slit and deduce the position of maxima and minima. **7+3**
(b) A plane wavefront of light of wavelength 5×10^{-5} cm falls on an aperature and diffraction pattern is observed in an eye piece at a distance of 1 meter from the aperature find the radius of the 100th half period element.
12. (a) Explain the principle and working of a He-Ne laser. **7+3**
(b) Calculate the length of the solution of Concentration 50 kg m^{-3} which produces an optical rotation of 45° . The specific rotation of the solution is $0.0523 \text{ rad m}^2 \text{ kg}^{-1}$.

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