B.Sc. I(PCM)

Paper-III (Optics)

Time:3Hours

Max.Marks-33

1(a) Explain the interference in thin films.

2(b) What is resolving power?

3(c) Describe the theory of construction of hologram.

4(d) What is normal dispersion?

Unit-I

2(a) Explain the interference in thin films. Derive the conditions for constructive & destructive interference in reflected & transmitted rays.

(b) The interference ratio of two coherent sources is β which are producing interference pattern. Prove that

$$(Imax - Imin)/(Imax + Imin) = \frac{2\sqrt{\beta}}{1 + \beta}$$

Or

(b) The intensity ratio of two coherent sources is 81: 1 which are producing interference pattern.Find the ratio of max. & min. intensities.

Unit-2

3(a) Discuss the Frounhoffer diffraction due to double slit . Explain the missing order to double slit. Explain the missing order in the double slit diffraction pattern.

(b) What is a zone plate? Discuss its theory. Compare its action with that of a convex lens.

Or

Describe briefly Fresnel's diffraction of light produced due to a circular aperature for axial & for far away other points(at screen)

Unit-III

4(a) What do you mean by population inversion? Explain the method of optical pumping.

(b) What do you mean by the interference of light? Define plane of polarization & plane of vibration.

Or

(b) What do you mean by optical rotation? Give Fresnel's theory of optical rotation.

Unit-IV

5(a) Prove that velocity of longitudinal wave in a solid rod depends upon the Young's modulus & density of the material.

(b) Write the statement of Fourier theorem explain its limitations.

Or

(b) Discuss wave propagation in 3D & explain its modes of vibration.

.