... 0.055 μm. Estimate the guide thickness. (3)

(b) Distinguish between intermodal and intramodal dispersion. Obtain an expression for material dispersion in a single mode fibre.
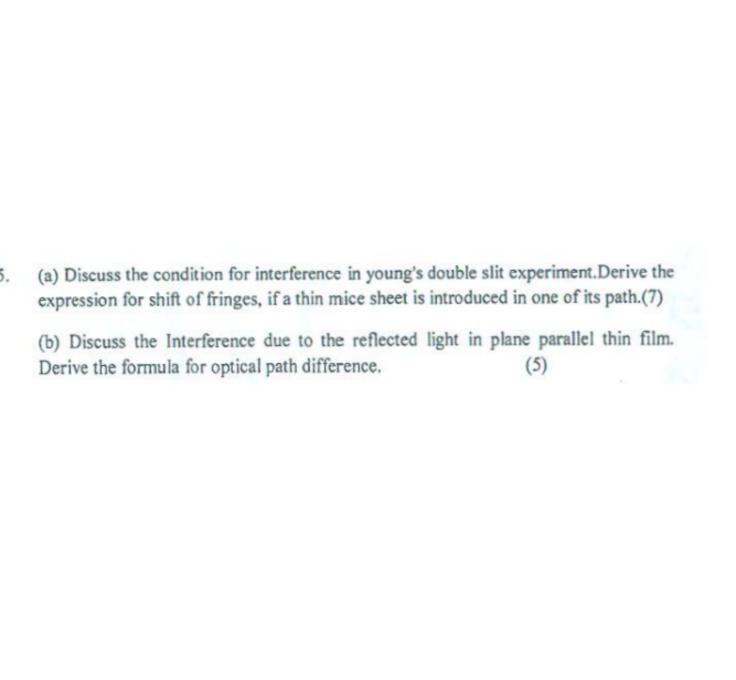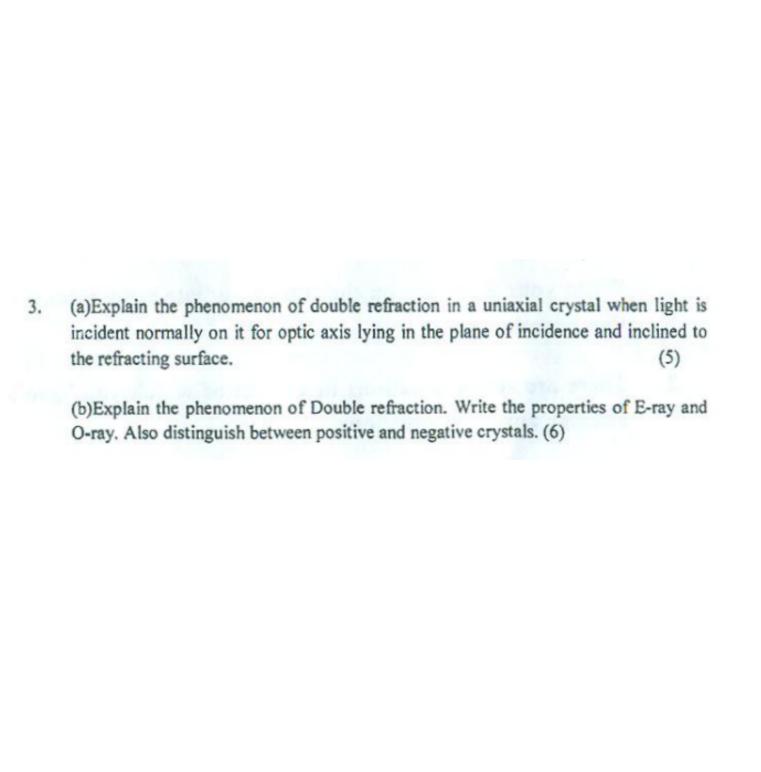
(7)

(c) Give various factors ...

phenomenon of double refraction. and elliptically

(7)

(b) What is quarter-wave plate? Calculate the thickness of a calcite plate which would

convert plane polarized li...

(b) Explain the formation of white central band and coloured bands on either side of centre when white light is incident normally on a transmission grating. Find an expression for dispersive power of a transmission grating.

(c) Find out if two Sodi... (4)

1. (a) Derive an expression for double slit diffraction pattern. Draw and explain resultant intensity distribution for the same. Also explain what are missing orders. (7)

5. (a) Discuss the condition for interference in young's double slit experiment.Derive the expression for shift of fringes, if a thin mice sheet is introduced in one of its path.(7)

(b) Discuss the Interference due to the reflected light in plane parallel thin film. Derive the formula for optical path difference. (5)

3. (a)Explain the phenomenon of double refraction in a uniaxial crystal when light is incident normally on it for optic axis lying in the plane of incidence and inclined to the refracting surface. (5)

(b)Explain the phenomenon of Double refraction. Write the properties of E-ray and O-ray. Also distinguish between positive and negative crystals. (6)

(c) For a plane transmission grating with 5000 lines/cm at the normal incidence

(i) What is the longest wavelength for which spectrum can be observed?

1. (a) Derive grating equation and explain, how it can be used to determine unknown wavelength. (7)

3. (a) In a uniaxial crystal, light is incident normally on it for optic axis lying in the plane of incidence and inclined to the refracting surface. Explain the phenomenon of double refraction for it. (7)

(b) Define Numerical aperture of an optical fiber. On what factors the information carrying capacity of the fiber optic communication system depends. Also explain for a silica fiber, how the loss of the output power depends on wavelength.   (7)

2. (a) Calculate the Fraunhofer diffraction pattern produced by a double slit arrangement with slit widths 'a' and with their centres separated by a distance 'b'. (6)

3. (a) What is Threshold Population Inversion ? Find the expression for the threshold population inversion density required for the oscillation of the LASER. 8

4. (a) Discuss the phenomenon of superposition of two rectangular simple harmonic vibrations of same period and show how it can be used for the production of linearly, circularly and elliptically polarized light.

7

(b) Explain the phenomenon of double refraction in uniaxial crystals when light is incident normally on it for optic axis perpendicular to the plane of incidence and parallel to the refracting surface.

5

(b) Light beam from external source falls obliquely on a thin film of an optical medium. Find the expression for the effective path difference between a part of the ray reflected externally at the first surface and the part of the ray which suffers one reflection internally at the other face.   5

(b) Derive Einstein Coefficients A and B for an atomic system.

4. (a) Derive an expression for the intensity distribution in single slit Fraunhofer diffraction pattern. Also give the positions of maxima and minima.