Q-1(A) Give the answer of following question. [04]
1) Write the formula to find the velocity of sound in solid.
2) The change in frequency due to Doppler effect does not depend on_____.

(B) Give the answer any one of following question. [02]
1) Calculate the velocity of sound in a gas in which two waves of length 50 cm and 50.4 cm produces 6 beats per sec.
2) Calculate velocity of sound in water. Volume elasticity of water $2.2 \times 10^9 \, N/m^2$.

(C) Give the answer any one of following question [03]
1) Explain acoustics in buildings.
2) Explain Newton's formula for velocity of sound in air.

(D) Give the answer any one of following question. [05]
1) Explain interference phenomena.
2) Discuss transverse wave travelling on a string and derive an expression for its velocity.

Q-2(A) Give the answer of following question. [04]
1) The capacitive reactance for d.c is_____.
2) What is transistor?
3) $I_E = I_B +$_____.
4) What is rectifier?

(B) Give the answer any one of following question. [02]
1) In a common base circuit α= 0.96. If the base current is 90 µA, what is the emitter current and collector current?
2) Explain choke input circuit.

(C) Give the answer any one of following question [03]
1) Explain construction and working of full wave bridge rectifier.
2) Prove that the maximum efficiency of a full wave rectifier is 81.2 %.

(D) Give the answer any one of following question. [05]
1) Describe transistor action (working) of N-P-N and P-N-P transistor.
2) Establish the following relations: (i) $IC = \alpha I_E + I_{CBO}$, (ii) $IC = \beta I_B + I_{CEO}$.

Q-3(A) Give the answer of following question. [04]
1) A very thin film appears _____ in reflected white light.
2) Formula of Determination of wavelength of light is β = ____ ?
3) Fresnel's Biprism is example of division of _____.
4) _____ can produce two coherent sources.

(B) Give the answer any one of following question. **[02]**

1) Newton's ring formed by sodium light between a flat glass plate and a convex lens are viewed normally. What will be the order of the dark ring which will have double the diameter of that of 40th dark ring?
2) Define types of interference.

(C) Give the answer any one of following question **[03]**

1) Derive equation for radius of nth order dark ring in Newton's rings.
2) Discuss the technique of obtaining interference..

(D) Give the answer any one of following question. **[05]**

1) Explain interference by transmitted light.
2) Explain Lloyd's single mirror and derive the formula of wavelength of light, fringe width β, D, d.

Q-4(A) Give the answer of following question. [04]

1) Define: Zone Plate.
2) Draw the construction of Fraunhofer diffraction.
3) Define: Transmitting Grating.
4) The area of each half period zone is equal to_____.

(B) Give the answer any one of following question. **[02]**

1) A zone plate has focal length 50cm at a wavelength 6000Å. What will be its focal length at λ = 5000Å.
2) What is plane diffraction grating?

(C) Give the answer any one of following question **[03]**

1) Comparison between zone plate and convex lens.
2) Discuss Fresnel's and Fraunhofer diffraction.

(D) Give the answer any one of following question. **[05]**

1) Discuss fraunhofer diffraction pattern due to a straight edge.
2) What is zone plate? Describe the construction and theory of zone plate.

Q-5(A) Give the answer of following question. [04]

1) Dispersive power W=_____
2) Give one example each of positive and negative uniaxial crystals.
3) Splitting of white light into different color is known as _____.
4) What is greatest importance of polarization?

(B) Give the answer any one of following question. **[02]**

1) Find the polarizing angle for light incident from (i) air to glass and (ii) water to glass. Given μ_{glass} =1.54 and μ_{water} = 1.33.
2) Define Fermat's principle.

(C) Give the answer any one of following question **[03]**

1) Write short notes on polarization by double refraction.
2) Derive relation between focal length f_1 and f_2.

(D) Give the answer any one of following question. **[05]**

1) Define cardinal points of a lens system.
2) Discuss Fermat's principle and prove laws of reflection.