Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Waves and Optics

Subject Code: 4SC04WAO1 Branch: B.Sc. (All)

Semester: 4 Date: 26/04/2019 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Give the full form of EM waves.
b) Light follows ---------- nature.
i) Particle ii) Wave iii) Both particle and wave iv) None
c) Mention any one difference between monochromatic and polychromatic waves.
d) Define Refractive Index.
e) What do you mean by a Zone plate?
f) Explain the phrase "Superposition of two waves".
g) Define Wave front.
h) What do you understand by the term "Aperture"?
i) What is Doppler effect?
j) What are acoustic waves?
k) Explain the concept of Polarization.
l) What are coherent waves?
m) What are single and double slits?
n) Define Beats.

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

a) Define Diffraction process. Name the two types of Diffraction. Explain in detail Fresnel diffraction. **(07)**

b) Define Fraunhoffer diffraction and explain in detail the intensity pattern of light at a single slit with a proper figure. **(07)**

Q-3 Attempt all questions (14)

a) Explain with suitable diagram the Huygen's principle. **(06)**

	b)	What is interference of light? Name the two types of interferences. Explain the division of amplitude and wave front with proper examples.	**(08)**
Q-4		**Attempt all questions**	**(14)**
	a)	A plane wave front of light of wavelength $5000A^0$ falls on an aperture and the diffraction pattern is observed in an eyepiece at a distance of 1 meter from the aperture. Find the radius of the 100^{th} half period element and the area of a half period zone.	**(07)**
	b)	A zone plate has focal length 50 cm at a wavelength $6000A^0$. What will be its focal length $\lambda = = 5000A^0$.	**(07)**
Q-5		**Attempt all questions**	**(14)**
	a)	Explain in detail the conditions to be followed for light to undergo constructive and destructive interferences in terms of phase and path difference.	**(07)**
	b)	Explain the principle, construction and working of a Michelson's interferometer.	**(07)**
Q-6		**Attempt all questions**	**(14)**
	a)	Explain the concept of Lissajous figures.	**(07)**
	b)	State and explain the principle of superposition of two perpendicular harmonic oscillations.	**(07)**
Q-7		**Attempt all questions**	**(14)**
	a)	State the Bragg's law of Diffraction. What is the difference between interference and diffraction?	**(06)**
	b)	Explain in detail the principle, construction and working of a Fresnel biprism with suitable figure.	**(08)**
Q-8		**Attempt all questions**	**(14)**
	a)	Briefly explain the Young's double slit experiment.	**(07)**
	b)	Explain the image formation in Lloyd's Mirror.	**(07)**