Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Waves and Optics

Subject Code: 4SC04WAO1 **Branch: B.Sc. (Chemistry,Physics)**

Semester: 4 **Date: 31/10/2018** **Time: 10:30 To 01:30** **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) Define a Wave front.
b) Define Zone plate.
c) What are acoustic waves?
d) Name the types of polarizations.
e) Define aperture.
f) What is polarization?
g) Define beats.
h) What do you mean by double slit?
i) Write a statement on the nature of light.
j) What do you understand by Electromagnetic waves?
k) Define refractive index.
l) Give the difference between monochromatic and polychromatic light.
m) What is Doppler effect?
n) What does superposition of waves mean?

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

Q-2 **Attempt all questions** **(14)**

(a) State and explain superposition of two perpendicular harmonic oscillations. **(07)**

(b) A zone plate has focal length 50 cm at a wavelength $6000A^0$. What will be its focal length at $\lambda = 5000A^0$? **(07)**

Q-3 **Attempt all questions** **(14)**

(a) Name the types of diffraction. Explain the Fresnel diffraction. **(07)**

(b) Explain the Fraunhofer diffraction and intensity pattern at single slit with proper figure. **(07)**

Q-4 **Attempt all questions** **(14)**

(a) Explain with proper diagram the diffraction phenomenon of light. What is the difference between interference and diffraction? **(07)**

(b) Explain with proper diagram the interference of light. Explain the division of **(07)**

amplitude and wave front with proper examples.

Q-5		**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 100th half period element and the area of a half period zone.	**(08)**
	(b)	Explain Huygens's principle.	**(06)**
Q-6		**Attempt all questions**	**(14)**
	(a)	What is Fresnel Biprism? Explain with suitable diagram how light behaves on passing through a biprism.	**(07)**
	(b)	Explain the process of image formation in Lloyd's Mirror.	**(07)**
Q-7		**Attempt all questions**	**(14)**
	(a)	What are Lissajous figures? How are they produced?	**(06)**
	(b)	Explain the construction and working of Michelson's interferometer with a neat diagram.	**(08)**
Q-8		**Attempt all questions**	**(14)**
	(a)	Name and define the two types of interference and give the condition of each type in terms of phase and path difference.	**(07)**
	(b)	Explain the Young's double slit experiment briefly.	**(07)**