Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name: Optics

Subject Code: 4SC04PHC1 Branch: B.Sc. (All)

Semester: 4 Date: 24/04/2017 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)	State a difference between transmission and reflection gratings	1
b)	Write the characteristics of Corpuscles	1
c)	How is Fresnel's diffraction different from Fraunhofer?	1
d)	State Fermat's Principle of least time.	1
e)	Give the definition for Zone Plate	1
f)	Define in general the term Resolving Power	1
g)	State Huygens Principle	1
h)	Under what condition Rayleigh's criterion of resolution is achieved?	1
i)	Give the condition for Diffraction	1
j)	Give the definition of Interference	1
k)	Define Grating element	1
l)	Define the term Diffraction	1
m)	Write the expression for focal length of a zone plate	1
n)	Draw the figures for divergent and convergent wavefronts.	1

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

Q-2 Attempt all questions (14)

a)	Describe Huygens theory of propagation of wave front in detail.	**7**
b)	Determine the laws of reflection at plane surface using Fermat's principle.	**7**

Q-3 Attempt all questions (14)

a)	Explain the construction of Zone Plate with suitable figures	**7**
b)	State 5 points of difference between Fresnel and Fraunhofer diffraction	**7**

Q-4 Attempt all questions (14)

a)	Explain in detail Fresnel's theory of rectilinear propagation of light.	**7**
b)	Write a note on Action of Zone Plate.	**7**

Q-5 Attempt all questions (14)

a)	Explain the theory of Plane transmission grating	**7**
b)	A zone plate has a focal length of 70cm at a wavelength 6000Å. What is its focal length at 7000Å?	**4**
c)	Give the expression for resolving power of a telescope; also mention how can	**3**

		you improve the resolving power of a telescope?	
Q-6		**Attempt all questions**	**(14)**
	a)	Give the differences between dispersive and resolving power of a grating.	**7**
	b)	Deduce the expression for resolving power of a microscope	**7**
Q-7		**Attempt all questions**	**(14)**
	a)	Discuss the method of determining wavelength of a spectral line using transmission grating.	**8**
	b)	Differentiate between Zone plate and convex lens	**6**
Q-8		**Attempt all questions**	**(14)**
	a)	Explain in detail Rayleigh's Criterion for resolution.	**8**
	b)	A grating has 6000 lines per cm. Find the angular separation of two yellow lines of mercury of wavelengths 5770Å and 5791Å in the second order	**6**