Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name :Optics

Subject Code :4SC04PHC1 **Branch: B.Sc. (Chemistry)**

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)	Define: Light rays.	01
	b)	What is an optical path?	01
	c)	What happens when the light rays pass through a prism? Draw figure.	01
	d)	State main applications of a prism.	01
	e)	What are the applications of the microscope?	01
	f)	What are the applications of the telescope?	01
	g)	Name different kinds of lenses. Write the applications of lenses.	01
	h)	Define divergent wave fronts and convergent wave fronts.	01
	i)	Draw figures of divergent wave fronts and convergent wave fronts.	01
	j)	What do you mean by the word grating?	01
	k)	Define the term Grating element and write its general expression.	01
	l)	State the major difference between Transmission grating and Reflection grating.	01
	m)	What is a zone plate?	01
	n)	Draw electromagnetic wave nature of light rays.	01

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

Q-2		**Attempt all questions**	**(14)**
	(A)	Discuss Huygens theory of the wave-front propagation. Discuss Huygens principle of secondary wavelets.	**08**
	(B)	What is Fermat's principle? Deduce the laws of reflection at the plane surface using Fermat's principle.	**06**

Q-3		**Attempt all questions**	**(14)**
	(A)	Explain Zone-Plate theory. Describe its construction with figure. Describe how Zone plate acts as a converging lens.	**09**

	(B)	Explain the double slit Fraunhofer diffraction by geometry method.	**05**
Q-4		**Attempt all questions**	**(14)**
	(A)	What is resolving power? Obtain an expression of resolving power of a telescope. How can the resolving power of a telescope be improved?	**09**
	(B)	Distinguish: Fresnel diffraction versus Fraunhofer diffraction	**05**
Q-5		**Attempt all questions**	**(14)**
	(A)	Discuss: Plane Transmission Grating Theory. Explain how to determine the wavelength of a spectral line by transmission grating.	**09**
	(B)	Distinguish: Zone Plate and Convex Lens.	**05**
Q-6		**Attempt all questions**	**(14)**
	(A)	Write a short note on Rayleigh's criterion for resolution. Mention different ways how can the resolution be increased.	**09**
	(B)	Distinguish: Dispersive power of a grating versus Resolving power of a grating.	**05**
Q-7		**Attempt all questions**	**(14)**
	(A)	Write a note on the resolving power of a prism.	**05**
	(B)	Write a note on the resolving power of a microscope.	**05**
	(C)	Distinguish: Prism Spectra versus Grating Spectra.	**04**
Q-8		**Attempt all questions**	**(14)**
	(A)	Draw and define Interference giving its conditions and types.	**04**
	(B)	Draw and define Diffraction giving its conditions and types.	**04**
	(C)	Draw and define Refraction giving its conditions and types.	**04**
	(D)	Draw and define Polarization giving its conditions and types.	**02**