

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Waves and Optics

Subject Code: 4SC04WAO1

Branch: B.Sc. (Chemistry, Physics)

Semester: 4

Date: 05/05/2018

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.
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Q-1 Attempt the following questions: (14)

- a) Define Wave front
- b) Define aperture
- c) What is Doppler effect?
- d) Define Zone plate
- e) What is sound wave?
- f) What is polarization?
- g) Define beats.
- h) What is single slit?
- i) What is EM wave?
- j) What is refractive index?
- k) Explain monochromatic wave.
- l) Explain the nature of light.
- m) What is acoustic wave?
- n) What is superposition of wave?

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

Q-2 Attempt all questions (14)

- (a) What is interference of light? Explain the division of amplitude and wave front with proper examples. **07**
- (b) How many types of diffraction? Explain the Fresnel diffraction. **07**

Q-3 Attempt all questions (14)

- (a) A zone plate has focal length 50 cm at a wavelength 6000\AA . What will be its focal length at $\lambda = 5000\text{\AA}$. **7**
- (b) Explain the Fraunhofer diffraction and intensity pattern at single slit with proper figure. **7**

Q-4 Attempt all questions (14)

- (a) A plane wavefront of light of wavelength 5000\AA falls on an aperture and the diffraction pattern is observed in an eyepiece at a distance of 1 meter from the **8**



	aperture. Find the radius of the 100th half period element and the area of a half period zone.	
(b)	Explain Huygens's principle.	6
Q-5	Attempt all questions	(14)
(a)	Explain the diffraction phenomenon of light. What is the difference between interference and diffraction?	7
(b)	State and Explain superposition of two perpendicular harmonic oscillations.	7
Q-6	Attempt all questions	(14)
(a)	What is Lissajous figure? Describe.	6
(b)	Explain the formation of fringes by Michelson's interferometer with neat and clean figure.	8
Q-7	Attempt all questions	(14)
(a)	Explain Fresnel Biprism with suitable figure.	7
(b)	Explain image formation in Lloyd's Mirror.	7
Q-8	Attempt all questions	(14)
(a)	Define types of interference and give condition of constructive and destructive interference in term of phase and path difference.	7
(b)	Explain the Young double slit experiment briefly.	7

