Envaller	Cream Coat No.	
Enrollm	Exam Seat No:  C.U.SHAH UNIVERSITY  Summer Examination-2019	-
Subject N	Name: Applied Optics	
Subject (	Code: 4SC04APO1 Branch: B.Sc. (All)	
Semester	:: 4 Date: 01/05/2019 Time: 02:30 To 05:30 Marks : 70	
(2) In (3) I	ons: Use of Programmable calculator & any other electronic instrument is prohibited. Instructions written on main answer book are strictly to be obeyed.  Oraw neat diagrams and figures (if necessary) at right places.  Assume suitable data if needed.	
	Attempt the following questions:	(14)
a)	What are the major ions in Ruby laser?	
<b>b</b> )	Give one example of Gas laser.	
c) d)	One example of solid state laser. What are advantages of optical fiber?	
e) f)	What is refractive index? What is monochromatic?	
g)	Define light.	
h)	What is critical angle?	
i)	What is TIR?	
<b>j</b> )	What material use to make the optical fiber.	
k)	What is sensor?	
1)	What is attenuation?	
m)	What is dispersion?	
n)	What is FBG?	

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

## **Q-2**

Q-1

**(14)** 

**Attempt all questions**What is stimulated emission? Explain how excitement of atom takes place. (a)

8



	<b>(b)</b>	Explain the condition for spontaneous emission.	6
Q-3	(a)	Attempt all questions Explain the meta stable state in semiconductor.	(14) 8
	<b>(b)</b>	Explain population inversion for production of photons.	6
Q-4	(a)	Attempt all questions Explain the principle and working of a PN junction laser.	(14) 7
	<b>(b)</b>	Explain the principle and working of Nd-YAG laser.	7
Q-5	(a)	Attempt all questions Explain the principle of light communication through fiber.	(14) 6
	<b>(b)</b>	What is the difference between single mode and multi mode fiber? Explain with suitable figure.	8
Q-6	(a)	Attempt all questions In an optical fiber, the core material has refractive index is 1.43 and refractive index of clad material is 1.4. Find the propagation angle.	(14) 7
	(b)	Calculate the numerical aperture of an optical fiber from the following data: $n_1$ (core)=1.546 and $n_2$ (cladding) =1.378	7
Q-7	(a)	Attempt all questions Prove: $B_{21}=B_{12}=c^3/8\Omega h f^3 \mu^3$ $A_{21}$	(14) 7
	<b>(b)</b>	Explain the Fourier transforming property of a thin lens.	7
Q-8	(a)	Attempt all questions What is holography? Show with figure.	(14) 6
	<b>(b)</b>	Explain the working principle of holography.	8

