NATIONAL INSTITUTE OF TECHNOLOGY GOA

Farmagudi, Ponda, Goa 403 401
Programme Name: B.Tech
Minor-II Examination,   April-2021

Course Name: Physics   **Course Code: PH100**
Date: 03.04.2021   **Time: 11.00 AM**
Duration: 45 Minutes   **Max. Marks: 20**

ANSWER ALL QUESTIONS

1. With the help of neat sketches, explain the three quantum processes that may occur when light radiation interacts with the matter   (4M)

2. In He-Ne laser, what is the function of He atoms? Why is it necessary to use a tube of narrow diameters?   (3M)

3. Find the relative populations of the two states in a ruby laser that produces a light beam of wavelength 6943 Å at 300 K and 500 K ($h = 6.624 \times 10^{-34} js$ & $c = 3 \times 10^8 \, m/s$)   (3M)

4. Show that the probabilities for stimulated emission and for a spontaneous emission are proportional   (4M)

5. A typical He-Ne laser emits radiation of $= 6328$ Å . How many photons per second would be emitted by a one milliwatt He-Ne laser?   (3M)

6. Calculate the numerical aperture, acceptance angle and critical angle of a fiber having a core refractive index 1.45 and the cladding refractive index 1.3   (3M)

*****All the best *****