

Sessional Examination 2021

B.Sc. 6th Semester (M)

Subject: Physics

Paper: 603 Modern Optics and Electromagnetic Theory

Full marks- 30

- 1 What type of pumping process is used in case of Ruby laser? 1
- 2 Write the unit of Einstein's coefficient of spontaneous emission. 1
- 3 What is a hologram? 1
- 4 Why do you need population inversion in laser? 1
- 5 Optical pumping is not generally used in gases to produce laser. Explain why? 2
- 6 Answer the following:
 - a. What is the unit of E/B , where E and B are the amplitudes of electric and magnetic fields? 2
 - b. "A space varying electric field can produce a magnetic field." Correct the sentence. 2
- 7 Describe the principle and construction of an optical fibre. 3
- 8 What are the two steps which explain the basic principle of holography? What is the difference between holography and photography? 4
- 9 Explain the working principle of Babinet compensator. 5
- 10 What is stimulated emission of radiation? Obtain a relation between rate of spontaneous emission and rate of stimulated emission. Show that for visible light of frequency $5 \times 10^{14} Hz$ at temperature $T = 10^3 K$ stimulated emission is negligible compared to spontaneous emission. 2+6+2