

Time : 3 hours

Marks : 80

- N.B. : (1) Answer any four questions from six questions
 (2) Draw neat figures whenever necessary
 (3) Handwriting should be legible
 (4) Use assumptions whenever necessary

- Q.1** a) What are the properties of Laser? **20**
 b) What is the importance of pumping in laser? Mention the types of pumping mechanisms
 c) What is Snell' law.
 d) Explain the types of Biomedical Optical Fibers.
- Q.2** a) In lasers, how is Longitudinal mode different from Transverse mode. **06**
 b) The length of optical cavity in the He-Ne laser is 30cm. The emitted wave length is 0.6328mm, **08**
 Calculate,
 (i) The difference in frequency between adjacent longitudinal modes
 (ii) The number of emitted longitudinal mode and its wave length
 (iii) The laser frequency
 c) Explain in detail the sequence in Photodynamic Therapy **06**
- Q.3** a) Explain the primary elements of fiber optic system, What is the function of a Repeater? **06**
 b) Explain the characteristic features of Optical fiber **08**
 c) A He-Ne laser ($n=1$) has a cavity length of 50cm and an output wavelength of 632.8cm. Find mode spacing and longitudinal mode number **06**
- Q.4** a) Explain in detail the construction, working and medical application of Ruby laser. **10**
 b) Enlist the Optical Fiber Fabrication Techniques, How is OVPO different from VPAD , Explain VPAD in detail. **10**
- Q.5** a) Explain the attenuation in optical fibers, explain the reason for signal losses in optical fibers **10**
 b) Explain the anatomical structure of flexible Endoscope and label all the parts. Which all accessories are used along with a flexible endoscope and for what purpose? **10**
- Q.6** a) Explain in detail Laser Angioplasty with a neat flow diagram **10**
 b) With the help of a neat schematic diagram, explain the Endo Speckle Fluoroscopy system **10**
