

**B. TECH. (CBCS - 2014 COURSE) SEM – VIII (BIOMEDICAL
ENGG.) : SUMMER - 2018**

SUBJECT: ELECTIVE-IV: LASERS AND OPTICAL FIBERS IN MEDICINE

Day : **Saturday** Time : **02.30 PM TO 05.30 PM**
Date : **09/06/2018** S-2018-4721 Max. Marks: 60

N. B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.

Q.1 Explain the fundamental aspects of laser. **(10)**

OR

Q.1 Explain the following terms related to laser physics.
a) Stimulated Emission and Amplification in Laser. **(05)**
b) Transverse electromagnetic modes. **(05)**

Q.2 Discuss in detail transmission of laser beams through materials. **(10)**

OR

Q.2 Explain in detail laser interaction with tissue. **(10)**

Q.3 Discuss in detail the light transmission in step index optical fiber with appropriate sketches. **(10)**

OR

Q.3 Discuss in detail the light transmission in graded index optical fiber with appropriate sketches. **(10)**

Q.4 a) Differentiate between ordered and non-ordered fiber bundles. **(05)**
b) With the help of neat diagram explain fiberscope. **(05)**

OR

Q.4 a) Find out numerical aperture, critical angle when $n_1 = 0.5$ and $n_2 = 0.47$. **(05)**
b) Find out V number for above numerical aperture, when $\lambda = 900\text{nm}$ and diameter is $10\mu\text{m}$. **(05)**

Q.5 a) Explain thin and ultrathin endoscopes in detail. **(05)**
b) What are the different light sources used in endoscopy? **(05)**

OR

Q.5 a) List and explain different auxiliary mechanical devices used in endoscopy. **(05)**
b) Explain the concept of distal end and proximal end in the endoscope. **(05)**

Q.6 Explain how fiber optic laser systems are used for treatment of cardiovascular diseases. **(10)**

OR

Q.6 a) Describe use of fiber optic lasers in ophthalmology. **(05)**
b) Write a short note on angiography. **(05)**

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