(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2295027 Roll No.

B.TECH

Regular Theory Examination (Odd Sem - VII) 2016 - 17

OPTICAL INSTRUMENTATION

Time : 3 Hours *Max. Marks : 100*

SECTION - A

1. Attempt all parts from the following : (10×2=20)

(a) What are coherent devices?

(b) How acousto optic effect is different from magneto optic effect?

(c) Why 4th quadrant is preffered for solar cell?

(d) What is an optical detector?

(e) Write an application of Rayleigh's interferometer.

(f) How to measure a spectrum?

(g) Differentiate between active and passive optical fiber sensor.

(h) How data can be stored optically?

(i) Categorize different types of optical fibers.

(j) What is Time domain dispersion?

SECTION - B

2. Attempt any five parts from the following eight parts: (5×10=50)

(a) Explain in brief the basic measurements that are required for characterising light sources.Also name various light sources.

(b) What are the various vibration modes in CO_2 laser, describe its operating principle and pumping mechanisms with the help of energy level diagram.

(c) Why does a Michelson interferometer produce fringes with an extended source but not with a point source?

(d) What is the principle of holographic interferometer? Differentiate between On-axis and Off-axis holography

(e) What is meant by acceptance angle of an optical fibre? Show how it is related to Numerical Aperture in case of graded index fibre.

(f) Describe the light source materials that are used in fabricating LED's for Optical Communication. Derive the expression for response time for LED.

(g) Explain the Laser Doppler effect.

(h) Explain the principle and operation of Spectrophotometer and Calorimeter.

SECTION - C

Attempt any two parts from the following 3 parts: (2×15=30)

3. (i) Explain the block diagram of fiber optic communication system?

(ii) Why is diffraction grating needed in optics?Explain the theory of plane diffraction grating.

4. Differentiate between the folllowing:

(i) Intensity modulated and displacement type sensors.

(ii) Single Mode and Multimode fibre sensors.

5. Write short notes on any **three** of the following :

(i) Microbend sensor

(ii) Neodymium laser

(iii) Electro-optic effect

(iv) Photoconductors

(v) OTDR