**AKGEC/IAP/FM/02**

**Ajay Kumar Garg Engineering College, Ghaziabad**

**Department of ECE**

**Sessional Test-2**

Course: B.Tech Semester: VII

Session: 2017-18 Section: K

Subject: Optical Instrumentation Sub. Code: NIC-031

Max Marks: 50 Time: 2 hour

***Note*** : Answer **all** the sections.

**Section-A**

1. Attempt **all** the parts. **(5x2 =10)**
2. What is an Optical Detector?
3. What is direct and indirect band gap energy?
4. How data can be stored optically?
5. What is the phenomenon of Total Internal Reflection?
6. Construct a Ruby laser.

**Section-B**

1. Attempt **all** the parts. **(5x5 = 25)**
2. Name different type of LED structures. Explain any one of them with proper diagram
3. Draw the characteristics of Avalanche photodiode. Explain its working with the help of construction diagram.
4. Differentiate between On-Axis and Off- axis holography.
5. An ideal photo-diode has an area of 1 by 1 cm and is illuminated by monochromatic light with a wavelength of 780 nm and with a power density of 1000 W/m2. At 300 K, the open circuit voltage is 0.683 V. What is its reverse saturation current, I0?
6. A fiber-optic gyroscope has a circular coil of diameter 12cm. The total length of the fiber used in the coil is 400m. If it is operating at λ=0.633µm, what is the phase shift corresponding to the angular speed of 5 x 10-4 rad s-1?

**Section-C**

1. Attempt **all** the parts. **(2x7.5 = 15)**
2. What is the role of He atom in He-Ne laser? Explain with the help of energy level diagram. Why is it necessary to use a narrow tube?
3. Explain how a hologram is recorded and holographic image is reconstructed from it, with the help of proper diagrams.