

Attempt any **four** parts of the following:

1. Explain briefly about the Zener diode as shunt regulator.
2. Describe about the superconductor materials.
3. A LED materials energy gap equals 2.5 eV. What wavelength will it radiate?
4. Write a short note on Insulated Gate Bipolar Transistor (IGBT).
5. Write the merits and demerits of Gunn diode.
6. Name and explain the three conditions for lasing action.

Attempt any **four** parts of the following:

1. Draw and explain the V-I characteristics of varactor diode.
2. What are the different types of substrate materials used in optical fibres?
3. Explain the Boltzmann's law for lasing action.
4. Describe the working of PLL and also mention about their applications in electronics.  
Describe the differences between photo conductive and photo-voltaic cells.
5. Discuss about the materials used for the construction of Laser.
6. Explain different modes of operation of a Gunn diode.

Attempt any **two** parts of the following:

1. (i) Describe briefly about the direct and indirect band gap semiconductors.(ii) Explain different types of electro-hole recombination methods.
2. Explain about the following operational parameters of photo detectors.(i) Response coefficient(ii) Quantum efficiency(iii) Bandwidth(iv) Noise equivalent power(v) Detectivity
3. Write short notes on:(i) Solar cell(ii) Semiconductor Laser

Attempt any **two** parts of the following:

1. Explain the operation of a photo diode. How would you use the device as photo detector and photo cell?
2. Draw the schematic diagram of IMPATT diode and explain the two effects that combine to produce  $180^\circ$  phase difference between the applied voltage and the resultant current pulse.
3. (i) Explain the construction and working of a TRAPATT diode.(ii) Draw and explain the construction of Schottky diode. How it is different from normal diode?