



# KINGS

COLLEGE OF ENGINEERING



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**QUESTION BANK**

**SUB.NAME : EC1011-OPTO ELECTRONIC DEVICES**

**BRANCH : ECE**

**YEAR/SEM : IV / VIII**

**UNIT I**

**ELEMENTS OF LIGHT AND SOLID STATE PHYSICS**

**PART-A (2Mark Questions)**

1. Define uncertainty principle of Quantum mechanics.
2. Define wave front.
3. Define refractive index.
4. What are the 3 kinds of polarization?
5. What is Hetero junction material?

**PART-B**

1. Derive and explain in detail the Schrödinger's wave equation (16)
2. Derive the electron energy in one electron atom using wave equation (16)
3. Describe in detail the position of Fermi level in semiconductor at equilibrium (16)
4. Explain in detail about Hall Effect (16)
5. Explain the various parameters and characteristics of semiconductor Hetero junction materials (16)

**UNIT- II****DISPLAY DEVICES AND LASERS****PART-A (2Mark Questions)**

1. What are the types of LED?
2. What is stimulated emission time?
3. Define Population inversion.
4. What is Mode locking of Laser?
5. Define DBR (Distributed Bragg Reflector) Laser.
6. What is threshold condition for Lasing?
7. What is the necessary condition for Lasing?

**PART-B**

1. Explain Emission, Absorption, and Radiation of Laser (16)
2. Explain the construction and working of various Display devices. (16)
3. Explain the following terms (16)
  - (i).Photo luminescence (ii).Cathode luminescence (iii).Electro luminescence
  - (iv).Injection luminescence
4. Write short notes on Mode locking of semiconductor laser (8)
5. Explain in detail the application of laser (8)
6. Discuss about the various Classification of laser (16)

**UNIT-III****OPTICAL DETECTION DEVICES****PART-A**

1. Define intrinsic photo conductor and extrinsic photo conductor.
2. Define Quantum efficiency of a photo conductor.
3. What is Johnson (or) thermal noise?
4. What is the gain of DC photo conductor?
5. Define directivity of a photo diode.
6. What is impact ionization?

**PART-B**

1. Discuss in detail about the construction and working of photoconductors, Also explain its classification (16)
2. Compare the noise performance of Photoconductor and PIN photodiode (16)
3. Discuss in detail about the construction and working of PIN photodiode (16)
4. Write a note on Hetero junction diode. (16)
5. Write a note on avalanche photodiode (16)

**UNIT-IV****OPTOELECTRONIC MODULATOR****PART-A(2Mark Questions)**

1. What are the advantages of optical fiber communication system?
2. Define birefringence
3. What is Electro-Optic effect?
4. Define Pockels effect and Kerr effect.
5. Why? Junction carrier –Injection modulators are called as BRAQWET modulator.
6. List the characteristics of Self-Electro-Optic Effect (SEED) Devices

**PART-B**

1. Differentiate Analog and Digital modulation techniques (8)
2. What is Electro-Optic Effect? and explain how this is suitable for electro-optic phase modulation and electro-optic amplitude modulation. (16)
3. Explain Quadratic Electro-Optic effect with suitable diagram (16)
4. Discuss in detail the Operation of Electro-Optic Amplitude modulation with necessary diagram. (16)
5. Explain the operation of Self Electro-Optic device with necessary diagram (8)
6. Write a short note on Bipolar controller Modulator (8)
7. Write a short note on Programmable memory devices (8)
8. Write short notes on the following
  - (i).Tunable threshold logic gates
  - (ii).Optical crossbar switching
 (8 + 8)

**UNIT V****OPTO-ELECTRONIC INTEGRATED CIRCUITS****PART-A (2Mark Questions)**

1. What is opto-electronic integration?
2. What are the challenges met by opto-electronic integrated circuit?
3. Define receiver sensitivity of photo receiver.
4. What are the three types of integration used in photo receiver?
5. Write the expression for power dissipation of a Laser.

**PART-B**

1. What is the need for integration of opto-electronic devices (8)
2. Explain briefly the application of opto-electronic integrated circuits(OEIC) (8)
3. With neat diagram, Explain the performance of Front end photo receivers (16)
4. Explain the noise and bandwidth considerations of photo receiver (16)
5. Explain the various steps involved in the fabrication of OEIC transmitter and also draw the equivalent circuit of integrated transmitter (16)
6. Explain in detail about the properties of optical guided wave and couplers. (16)