

**SRM Institute of Science & Technology**

**Faculty of Engineering & Technology**

Ramapuram Campus

**UNIT IV**

**PART A**

1. Digital communication is suitable for

(a) low frequency application

**(b)large bandwidth application**

(c) long distance communication

(d)large wavelength application

2. Induced birefringence is called

(a) magneto optic effect

**(b)electro optic effect**

(c) acousto optic effect

(d)thermal optic effect

3. Kerr effect occurs when …………………………?

(a) electric field is zero

(b) quadratic electro optic coefficient is smaller than linear electro optic coefficient

**(c) quadratic electro optic coefficient is larger than linear electro optic**

**coefficient**

(d)magnetic field is zero.

4. Pockel effect occurs when …………………………?

(a) electric field is zero

**(b)quadratic electro optic coefficient is smaller than linear electro optic**

**coefficient**

(c) quadratic electro optic coefficient is larger than linear electro optic

coefficient

(d)magnetic field is zero.

5. An example for material showing electro optic effect is

(a) germanium

(b) carbon

**(c) Lithium Niobate**

(d)silicon

6. The change in refractive index of a material subjected to a steady

magnetic field is called..........?

(a) coulomb blockade effect

(b) photo emissive effect

(c) electro optic effect

**(d)Magneto optic effect**

7. Optical isolator is required to

**(a)pass light only in one direction.**

(b)isolate electric field.

(c) isolate magnetic field

(d)split the polarization.

8.The change in refractive index of a medium due to the presence of

sound waves is called

**(a) acousto optic effect**

(b) coulomb blockade effect

(c) photo emissive effect

(d) electro optic effect

9.Doping helps to improve the

(a)stability

(b)resistivity

(c) mobility

**(d)conductivity**

10.Extrinsic semiconductors are

(a)semiconductor in its pure form

**(b)Doped semiconductors.**

(c)semiconductor at fixed temperature

(d)semiconductor at constant pressure

11.Potential barrier in silicon is

(a) 0.3 V

**(b)0.7 V**

(c) 1 V

(d) 0.45 V

12.P-N Junction under forward bias has

**(a) reduced depletion region**

(b)increased depletion region

(c) increased resistivity

(d)increased potential barrier.

13.An example for light source is

(a) APD

**(b)LED**

(c) PIN DIODE

(d)RTD

14.The movement of carriers under the presence of electric field is

(a) diffusion

(b)Diffraction

**(c) drift**

(d) dispersion

15.Current density in a n-type semiconductor depends on

(a) mobility of holes

**(b)mobility of electrons**

(c) magnetic field strength in the semiconductor

(d)polarization in the semiconductor

16.Population inversion is related to

(a) LED

**(b)LASER**

(c) APD

(d)RTD

17. Which are the two main sources of noise in photodiodes without

internal gain?

a) Gaussian noise and dark current noise

b) Internal noise and external noise

**c) Dark current noise & Quantum noise**

d) Gaussian noise and Quantum noise

18. **Optoelectronic device works on \_\_\_\_\_\_\_\_\_\_\_.**

1. light
2. Electrical current
3. **Both light & Electrical**
4. Chemical

19. In a longitudinal electro-optic modulator, half-wave voltage is that voltage which introduces the following phase shift between two polarization components:

(a) /4

(b) /2

**(c)**

(d)

20.In \_\_\_\_\_\_\_\_\_\_\_\_effect the variation in refractive index is proportional to the square of the electric field

1. Pockel
2. Kerr
3. Faraday
4. Skin

21.Induced Birefringence in an isotropic crystal by the application of an electric field is called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Photo emissive effect
2. Acoustic optic effect
3. **Electro-optic effect**
4. Magento optic effect

22.A uniaxial crystal has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(a) one principal refractive index and no optic axis.

(b) one principal refractive index and one optic axis.

(c) two principal refractive indices and one optic axis.

(d) three principal refractive indices and two optic axis

23.The change in the refractive index of a crystal due to the application of an electric field is called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Photo emissive effect
2. Acoustic optic effect
3. **Electro-optic effect**
4. Magento optic effect

24.In a transverse electro-optic modulator\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(a) Vp is independent of the length l and width d of the modulator crystal.

(b) Vp is dependent on the length l but not on the width d of the crystal.

(c) Vp is dependent on the width d but not on the length l of the crystal.

**(d) Vp is dependent on the ratio d/l**

25.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a device that helps to attain population inversion in optical amplifiers

1. Coupler
2. Attenuator
3. **Pump source**
4. Repeater

**PART B**

1.What is meant by Electro Optic Effect?

2. Define Kerr Effect.

3.State about the Pockels effect.

4.Define Acousto Optic Effect.

5.Discuss about the Birefringence briefly.

6.How longitudinal electro optic modulator differs from transverse electro optic modulator?

7.Write a short note about Raman Nath Modulator.

8.Brief about optical amplifiers and its applications.

9.Compare Preamplifiers with Power amplifiers.

10.Derive the expression for optical amplifier gain.

11.Explain about Raman Amplifiers with neat sketch.

12.Write briefly on the types of optical amplifiers

**PART C**

1. With a neat diagram, Explain the working principle of Longitudinal Electro Optic Modulator.

2. Elaborate on the working principle of Transverse Electro Optic modulator with a neat sketch.

3.Discuss in detail the Acousto Optic Modulator with a neat sketch.

4.Describe the working principle of optical amplifiers in detail.

5. Elaborate on the working principle of Raman Optical Amplifiers with a neat sketch.

6. Derive the expression for power, efficiency, and gain of Semiconductor optical amplifiers.

7.Describe the amplifier mechanism of Erbium-Doped Fiber amplifiers with corresponding energy level diagrams.

8.Discuss in detail the principle and operation of a photonic switch based on self-electro optic Device (SEED).

9.Explain in detail about Raman Nath (Transmission type) and Bragg modulator(Reflection type)

10.Explain with a neat diagram, the construction and working of electro optic effect based longitudinal electro optic modulator.

11.Explain in detail about Fiber Raman Amplifier with a neat diagram.

12.Discuss the basic configuration, working principle and gain of Semiconductor optical amplifier (SOA).