

Q → 01
Part (D)

What are the important types of Fiber optic Cables? Draw ~~the~~
Explain them in brief?

Ans: *

Types of fiber optic Cables:-

In practice, there are three commonly used type of fiber optic cable:-

→ Multimode step index

→ Single mode step index

→ Multimode graded index.

→ Multimode step index:- The multimode step index fiber cable is probably the most common and widely used type. It is the easiest to make and therefore the least expensive.

→ Single mode step index:- A single mode or monomode step index fiber cable eliminates modal dispersion by making the core so small that the total number of modes or paths through the core is minimized.

→ Single Mode Step index:- This type of cable is extremely small, difficult to make and therefore very expensive.

Q → 01 Explain the process of a free space optical communication system. Also make a diagram illustrate the concept thoroughly.

Ans:- **Free Space Optics (FSO):**
is a wireless technology that transmit data technology that via laser beams. It is uses light to transmit data between buildings that have clear a line of a sight (LOS).

Principle:-

FSO work on the same principle infrared by TV remote, wireless keyboard wireless Palm devices. In early days both transmitter and receiver are used separately but in modern era it is replaced transceivers.

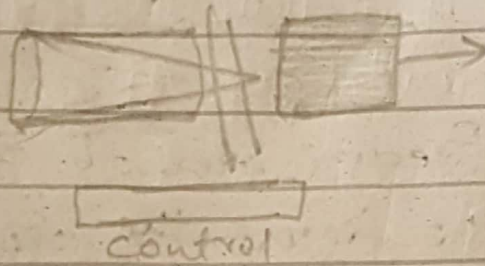
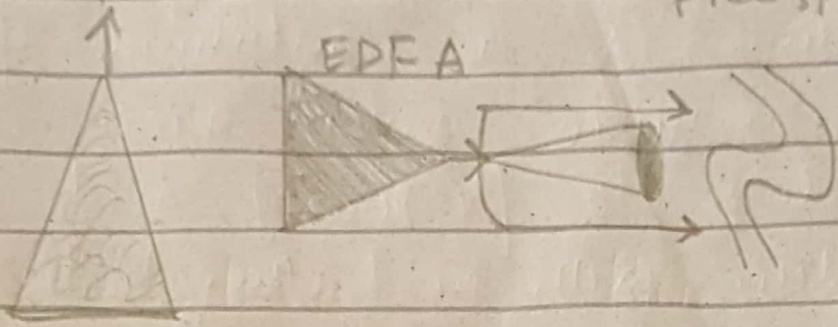
Advantages of FSO System:-

- * No licensing required
- * Very low installation cost
- * No sunk costs
- * No capital overhangs
- * Highly secure transmission problem

Architecture:-

Data

Free space



Q1 What is optical spectrum? Explain Part(A) the spectrum according to wavelength or frequencies?

Ans: Optical spectrum:-

The decomposition of the power of energy of light according to different wavelengths or optical frequencies

According to wavelength

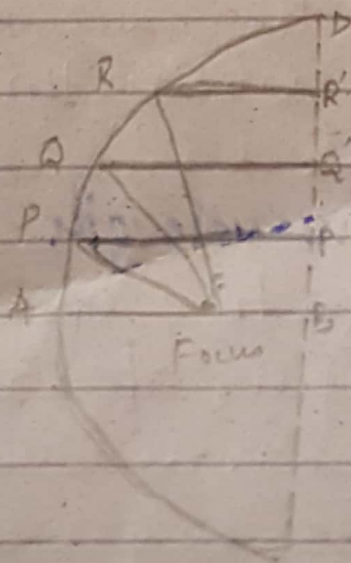
The electromagnetic spectrum is a continuum of all electromagnetic wave arranged according to frequency and wave length from 0.4 microns (blue) to 0.7 microns (red)

According to Frequency:-

The electromagnetic spectrum is a continuum of all electromagnetic waves arranged according to frequency and wavelength. The sun, earth and other bodies radiate electromagnetic energy of various wavelengths. Electromagnetic energy passes form of sinusoidal waves.

Q → 09 Explain the Feeding Method of Parabolic Antenna? Draw the figure to explain the concept

Ans:- Parabolic Antenna:- The parabolic antenna is a plane curve defined as the locus of a point which moves so that its distance from another point (called the focus) plus its distance from a straight line (directrix) is constant.



Q → 02

Part (C) Feeding Mechanism of Parabolic Reflector.

Types of feeding:

⇒ Center feed Parabolic Reflector.

⇒ Offset feed Parabolic Reflector

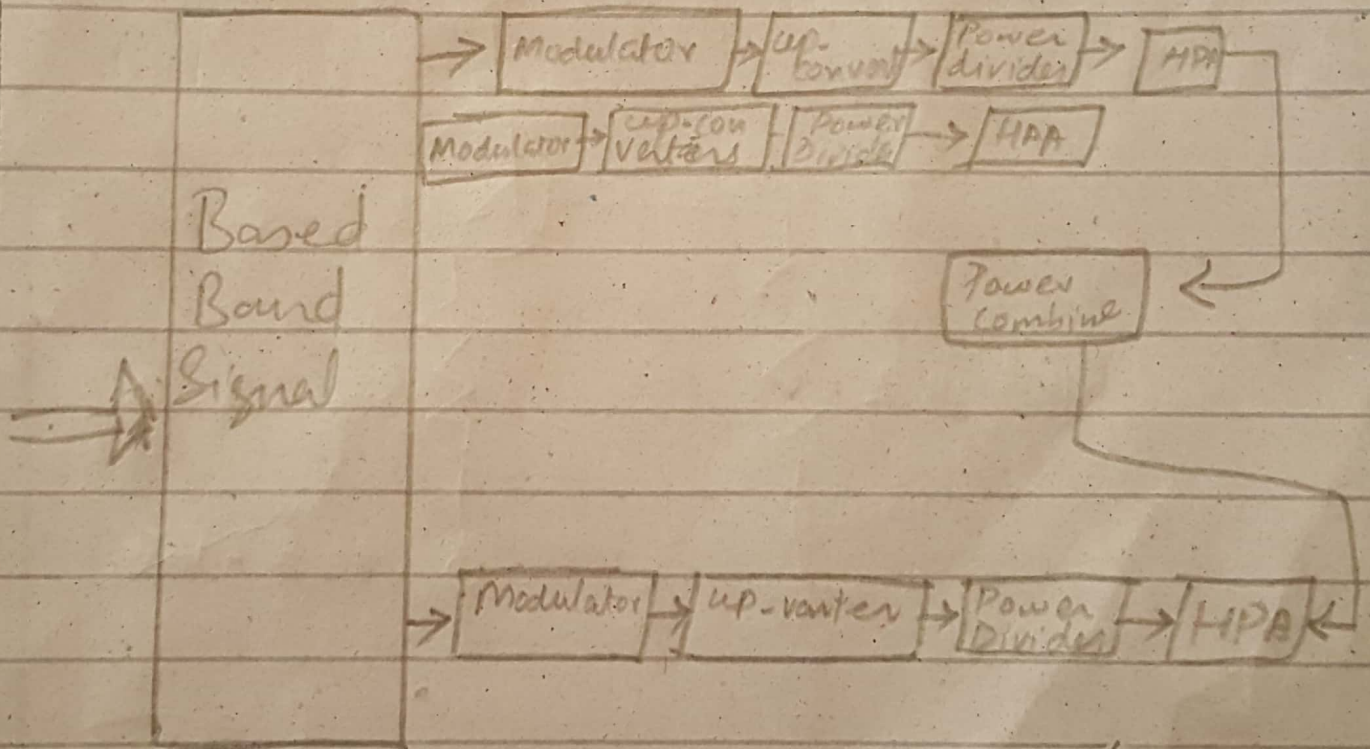
⇒ Cassegrain feed (center)

Cassegrain offset Feed

Q → 02 Explain the functionality of a microwave receiver? Draw the figure to illustrate the components used in it?

Ans:- It is used to amplify the weak signal that is gathered by the antenna in a radar radio or other communication system or sensor. The most common receiver superheterodyne.

Diagram:-



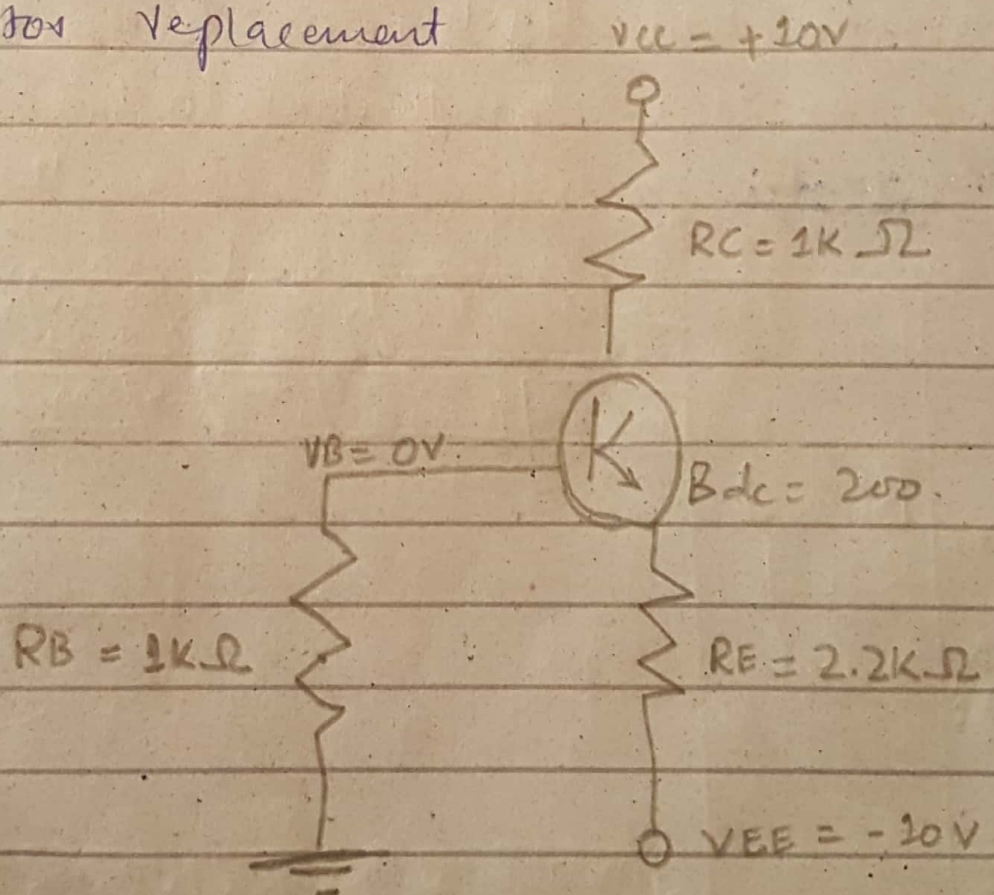
Q 302
Part B)

Name the three important microwave transistor used in microwave system. Explain in brief.

Ans:-

Microwave transistor is made of operate in microwave frequency unlike normal BJT. These are with typically 5 watts at the frequency of 3GHz with a gain of 5db.

Emitter Bias:- is very good and stable way to bias transistor as both positive and negative power supplies are available. Emitter bias fluctuates very little with temperature variation and transistor replacement.



To collector to base feedback configuration ensures that the transistor is always biased in the active region regardless of the value of Beta (β). The DC base bias voltage is derived from the collector voltage V_c thus providing good stability.

Q \Rightarrow 02 Part (c) How a one-quarter wavelength microstrip can transform impedance and reactance?

Ans: Reactance in transmission lines is defined as the opposite to a circuit element that brings a variation in the current or voltage. This is due to the inductance or capacitance present inside the element. For a deeper insightful view, join electrical business training courses at online.

Q → 03
Part (D) What is the different between a wavelength and a cavity Resonator?

Ans:- **Waveguide and Cavity Resonator:-**

Most microwave energy transmission above 6 GHz is handle by wave guides.

Waveguide are hollow metal conducting pipes design to carry and constrain the electromagnetic wave of microwave signal.

Cavity Resonator:- A cavity Resonator is a waveguide like device that acts like a high-Q parallel resonant circuit. A simple cavity resonator can be formed with a short peice of waveguide on half wave length long. Energy is coupled into the cavity with a coaxial probe at the center.

Circulator:-

A circulator is a three-port microwave device used for coupling energy in only one direction around a closed loop. Microwave energy is applied to one port and passed to another way to third port.

Q → 03

Part (B)

What are the basic element of a fiber optics communication system? diagrammatically?

Ans:-

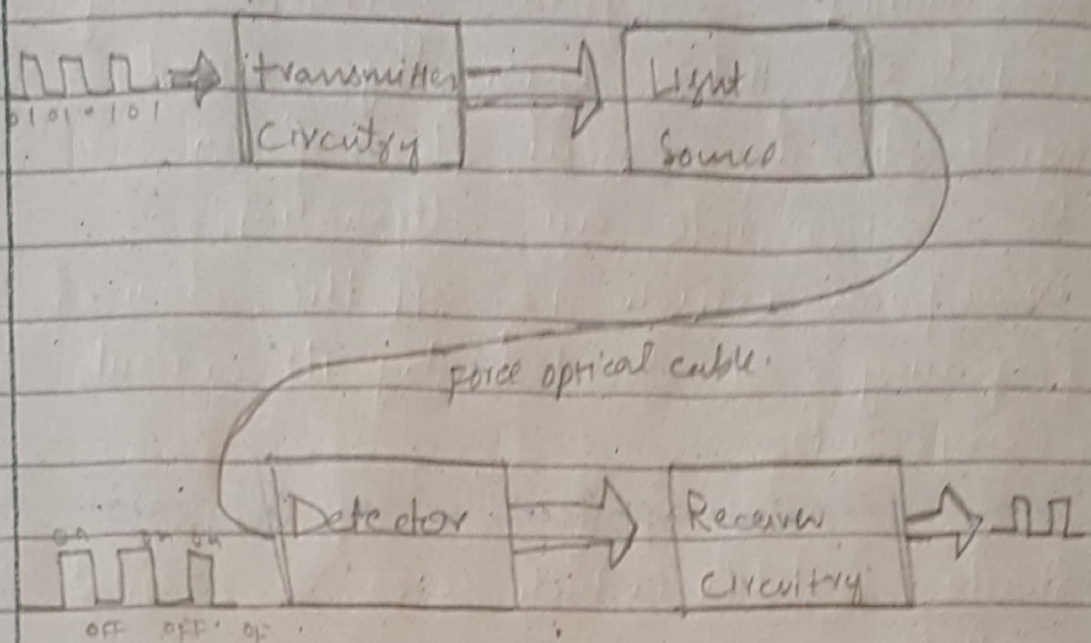
Depending on the application like local area networks and long haul communication system, the light resources requirement vary.

The requirements of the sources includes power, speed, spectral line width, noise, ruggedness, cost, temperature and so on.

Low Loss Optical Fiber:- is a cable which is also known as cylindrical dielectric waveguide made of considers the parameters like the tensile strength, durability and rigidity. The optical cable is made of high quality extruded glasses (Si) or plastic and it is flexible. The diameter of the fiber optic cable is in between 0.25 to 0.5 mm (slightly thicker than a human hair).

Photo Detectors:- The purpose of photo detector is to convert the light signal back to an electrical signal. Two type of photo detector are mainly used for optical receiver in optical communication system. These material

used include silicon, germanium,
GaAs ok



Quest#03 What are the important type of small
Part(A) signal amplifier in used microwave
devices. Each Explain in brief?

Ans:- In small signal amplifiers the
variations of base current from
DC from value is small.

Variation of collector current will
be within the active regions. So
output is exact replica of input
signal with amplification. Transistor
between as linear element.

Harmonic distortion is not present
voltage amplifiers.

Q#03 How oscillator diodes are different
Part(C) from normal diodes? Explain the
concept in brief?

Ans

An Oscillator is an circuit which produces a continuous repeated alternating waveform without any input. Oscillators basically convert unidirectional current flow from DC source into an alternating waveform which is off the desired frequency, as decided by its circuit components.

Some Common applications of Oscillator:

- * Quartz watches (which uses a crystal oscillator)
- * Used in various audio systems and video systems
- * Used in various radio TV and other communication devices.

Type of semiconductor diod. Normal (p-n) diod. which operate as described above are usually made of doped silicon or germanium. Before the development of silicon power rectifier diodes, cuprous oxide and later selenium