WORKSHEET – 1.1

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Aim:

Elaborates the different transmission medias and steps to create the connector to make an ethernet connection possible.

Requirements:

- RJ – 45 connector
- Wire
- Clamping tool

Different types of Transmission Medias:

1. **Guided Media:**
    - **Coaxial –** Baseband, Broadband
    - **Fibre Optics**
    - **Twisted –** Unshielded, Shielded

2. **Unguided Media:**
    - Radiowaves
    - Microwaves
    - Infrared

Guided Media

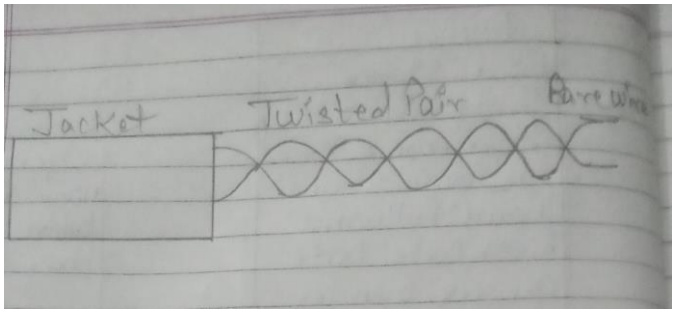
Guided media is the physical medium through which the signals are transmitted.

It is also known as bounded media.

Types of Guided Media

1. **Twisted Pair Cable:**

    - Twisted pair is a physical media made up of a pair of cables that are twisted with each other.
    - It consists of two insulated copper wires arranged in a regular spiral pattern.
    - The degree of reduction in noise interference is determined by the number of turns per foot. Increasing the number of turns per foot decreases noise interference.
    - Its frequency range is from 0 to 3.5 KHz.



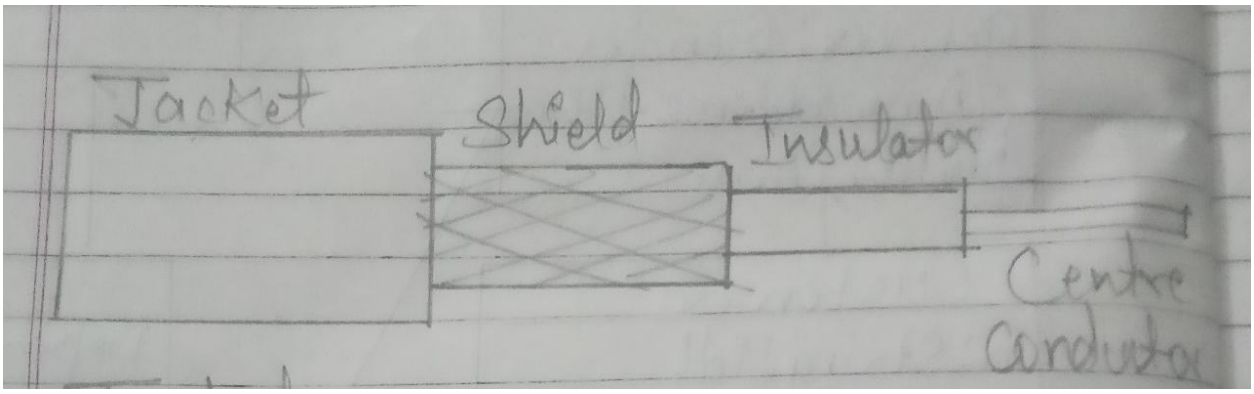
It is of two types:

a. **Unshielded Twisted Pair Cables(UTP Cables):**
   - This cable consists of two insulated copper wires twisted around one another.
   - It is used for in telecommunication.

b. **Shielded Twisted Pair Cables(STP Cables):**
   This cable contains the mesh surrounding the wire that allows the higher transmission rate.

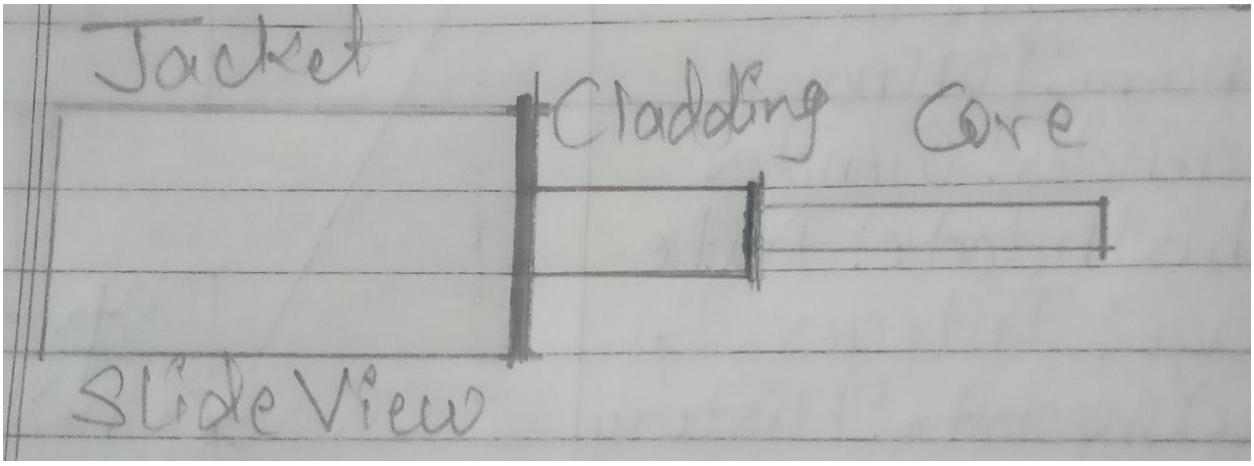
2. **Coaxial Cable:**

   - This cable is called coaxial because it contains two conductors parallel to each other.
   - Its inner conductor is made up of copper and the outer conductor is made up if copper mesh.
   - The middle core is made up of non – conductive cover that separates the inner conductor from the outer conductor.
   - It is very commonly used transmission media, for example: TV wire is usually a coaxial cable.



3. Optical Fire Cable:

- It is a cable that holds the optical fibres coated in plastic that are used to send the data by pulses of light.
- The plastic coating protects the optical fibres from heat, cold, electromagnetic interference from other types of wiring.
- Fibre optics provide faster data transmission than copper wires.



Unguided Media:

- An unguided transmission transmits the electromagnetic waves without using any physical medium.
- It is also known as wireless transmission.
- In unguided media, air is the media through which the electromagnetic energy can flow easily.

Types of unguided transmission:

1. **Radio waves:**
    - Radio waves are the electromagnetic waves that are transmitted in all the directions of free space.
    - Radio waves are omnidirectional, i.e., the signals are propagated in all the directions.
    - The range in frequencies of radio waves is from 3Khz to 1 khz.
    - An example of the radio wave is FM radio.

1. **Microwaves:**
    - Microwaves are the electromagnetic waves having the frequency in the range from 1GHz to 1000 GHz.
    - Microwaves are unidirectional as the sending and receiving antenna is to be aligned, i.e., the waves sent by the sending antenna are narrowly focused.

2. **Infrared:**
    - An infrared transmission is a wireless technology used for communication over short ranges.

    - The frequency of the infrared in the range from 300 GHz to 400 THz.
    - It is used for short-range communication such as data transfer between two cell phones, TV remote operation, data transfer between a computer and cell phone resides in the same closed area.

Steps to create the connector to make an ethernet connection possible:

Step 1: Use the cable strippers at about 1-2 inches from the end of the cable to remove the outer jacket.

Step 2: Untwist the twisted pair wires in all the way back to the jacket. This can be done just like a regular twist-tie on a loaf of bread, but with four of them of different colors.

Step 3: Align the untwisted wires in the order necessary for our needs.

Step 4: Cut the extra wire. Once we've untwisted the wires, we'll have a superfluous amount of copper wiring left; we don't need this much. Use the wire-cutting scissors to cut these off.

Step 5: Push the remaining wires into the RJ45 head according to color code. Be careful not to bend the wires while pushing them in or run the risk of creating a bad cable.

Step 6: Push the connector inside the crimping tool and squeeze the crimper all the way down.

Step 7: Repeat steps 1-6 for the other end of the cable.

Step 8: To make sure we've successfully terminated each end of the cable, use a cable tester to test each pin.