Meklit Mesfin

1.UTP is unshielded meaning it doesn't have protection layer against electromagnetic inference leaking in and out of the cable STP is the reverse

2.Better resistance to electromagnetic inference ,grounding is possible,long distance can be traveled

3.Insulated copper cable used to carry high frequency data signals its common use is TV cable and broadband internet

4. To provide a secure and reliable connection between a coaxial cable and another device or component its used sed for digital and analog media transmission

5.RJ 45 has 8pin connector while RJ 11 has 6 pin connectors

6. Cat 5e-1gbps for data transmission and 100m range .

Cat 6: - Maximum data rate: 10 Gbps (up to 55 meters), 1 Gbps at 100 meters

7.Single-mode Fiber (SMF) :has a very narrow core (typically around 8-10 micrometers in diameter)

Multimode Fiber (MMF):has a larger core (typically 50 or 62.5 micrometers in diameter)

8.SMF uses lasers, MMF uses LEDs, SMF supports longer distances.SMF has higher speed and cost than MMF

9. Its advantage is it's Immune to interference, hard to tap  
- Fast and high-volume data transmission

10.T568A vs. T568B

T568A:  
1. White/Green  
2. Green  
3. White/Orange  
4. Blue  
5. White/Blue  
6. Orange  
7. White/Brown  
8. Brown  
  
T568B:  
1. White/Orange  
2. Orange  
3. White/Green  
4. Blue  
5. White/Blue  
6. Green  
7. White/Brown  
8. Brown

11.Straight-through: connects different devices (e.g., PC to switch)  
12.Crossover: connects similar devices (e.g., PC to PC)

13.Tools: crimping tool, cable tester, wire stripper

14. PC to switch (straight), PC to PC (crossover)

15.Twisted Pair: lowest cost, slow, moderate interference  
 Coaxial: medium cost, moderate speed, some shielding  
 Fiber Optic: expensive, fastest, immune to interference

16.A framework explaining how devices communicate over a network in layers

**17-18. Communication Modes**

Simplex: one-way (TV)  
Half-duplex: two-way but not simultaneous (walkie-talkie)  
Full-duplex: both ways at the same time (phone)  
Half vs Full: full supports both directions at once

19.Protocols define communication rules, handle errors, and ensure security

20. The basic elements are Sender, Message, Medium, Protocol, Receiver

**21-22. OSI Layers & Protocols**

Layers: Application, Presentation, Session, Transport, Network, Data Link, Physical  
Examples: HTTP, TCP, IP, Ethernet, Fiber optic

**23-24. Transport & Network Layers**

Transport: breaks and reassembles data, ensures reliable delivery (TCP, UDP)  
Network: routing and logical addressing (IP)

25.Transport: Segment  
Network: Packet  
Data Link: Frame  
Physical: Bits

26.Router: uses IP, connects networks  
Switch: uses MAC, connects devices in LAN  
Hub: broadcasts data to all devices

27.

1. Application: user action  
2. Presentation: formatting  
3. Session: connection handling  
4. Transport: segmentation  
5. Network: addressing  
6. Data Link: framing  
7. Physical: transmission

28.Standardizes communication, simplifies troubleshooting, aids learning

29.

1. Write letter  
2. Envelope  
3. Decide when to send  
4. Stamp & verify  
5. Route to city  
6. Deliver to address  
7. Physical delivery

30.Both are layered models  
OSI is a reference model  
TCP/IP is practical and used in real-world networking