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Task:

1]. Define The Type of network
(LAN, WAN, MAN, WLAN)

1] LAN : Local Area Network : it Can be wired or wireless
A Small network within a single building ~~or~~
eX: (home wifi or office network)

2] WAN: wide Area network :
A large Network Covers Citikies and Countries
eX: Internet _ banking network Connecting branches in different Countries

3] MAN : MetroPolitan Area Network:
a network Covering a City or Groub of buildings.
eX:- A university network Connecting multiple buildings across a City.

4] WLAN:- (wireless LAN) :
A LAN that uses only wifi instead of Cables.
eX: (A wifi hotspot in a Coffee shop or you hame wifi but all devices are Connected wirelessly)

Every WLAN is a LAN but Not every LAN is a WLAN
A LAN Can include both wired and wireless Connections, while a WLAN is only wireless.

4. identify The topology used in The network (Bus, star, Mesh)

1] Bus Topology:- old Mode and all devices are Connected with Each other with one Cable (backbone)

2] Ring Topology:- less older, Every Device will Connect with two devices

3] Star topology:- Current Mode and Connect all Devices with A switch.

4] Mesh topology :- More modern and well known, All devices Connect with them selves.

- Hub:- BroadCast device, Connects devices in The same network, only one device Can send data at the a time and Doesn't Store any device information.
- switch:- Multi Cast device, Connects devices in The Same network, multiple devices Can send data at the Same time and stores and uses MAC addresses to trasfer Data.
- Router:- a Routing device, Connects devices from different networks, Multiple devices Can send data at the same time and uses IP addresses To transfer data.

2. (ARP):- Resolves IP addresses To MAC addresses for local network Communication
. (NAT):- Translates Private IPs to Public IPs for internet access.
. (DNS):- Converts Domain Names to IP addresses.

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3 TCP vs UDP analysis: Provide two applications examples using TCP and two using UDP, explaining why they are suitable "real life examples"

(Transmission Control Protocol)

TCP is reliable, ensures that data transferred in order and without any loss, it's used in applications where data integrity is critical.

ex 1:- online banking transactions:-
online banking secure and complete Data transfer without any loss, if a packet is lost, TCP ensures it's resent such as Fund transfer and account updates.

ex 2:- Email services:-
when sending an email it's important that the entire message is received without corruption or loss if we used UDP the message will not be meaningfull.

UDP (User Datagram Protocol):
it's Faster and used in Time sensitive appli where small loss in Data is acceptable.

1 live sports streaming:
speed is more important than Data accuracy

if a Packet is lost, The video Continues rather than Pausing for retransmission.

[2] online MultiPlayer Gaming:

In gaming, real-time updates are essential. Delays Caused by TCP would negatively impact the experience and The Competition between Players. Instead, UDP Periorities Speed, even if some Data is lost, so UDP makes Gaming smoother ~~and~~, reduce Lag and Keep Comptitive Fairness.

[4] OSI Model & TCP/IP Model: Map out how data travels From asender to areCeiver Using The 7 layers of The OSI Model. EXPlain how TCP/IP differ from OSI

in OSI Model Data goes Through 7 layers, each adding or Processing information using specific Protocols and devices

1- APPlication Layer (7)

The user interacts with an application like web browser, whatsapp or Email, it Provides Direct Communication between User & network services. it's responsible for data Generation & user interaction it uses (HTTP → SMTP) Protocols

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[2] Presentation layer (6)
it's responsible for Data Translation to ensure Compatibility between different devices (ex: if a windows system use UTF-16 encoding, while a linux system uses UTF-8, The Presentation layer ensures correct translation., it's also responsible for Data Encryption & Decryption using (TLS / SSL) Protocols. it's responsible for Data Compression & De Compression, Encoding & Decoding

[3] Session layer (5)
it's responsible for Establishing, managing & terminating Communication Sessions; it Establish the session before Communication begins, Maintains The session while data is being Transmitted, Terminate The session at The end (ex: when you log into an online banking website, a session is created until you log out, & it's responsible for Dialog Control (Full_Duplex & Half_Duplex) and Security. (NetBios_RPC_NFS) Protocols are used.

[4] Transport layer (4):
Breaks Data into Segments, Provides reliable messaging and ensure That Data is Transmitted in order without errors, it uses (TCP/UDP) Protocols

[5] Network layer (3):
Adds The IP addresses, select The shortest Path To Transmite The Packet (uses RIP, OSPF Protocols)

[6] Data link layer (2)
Converts Data into Frames and Adds MAC addresses

, deals with switches for local delivery

7] Physical layer (1):
Converts frames into binary signals and send them over wifi, Ethernet or Fiber optics

TCP/IP model has only 4 layers.

TCP/IP Model is Practical and used in real-world networks, like The internet but OSI Model is a Conceptual Framework For learning how networks function

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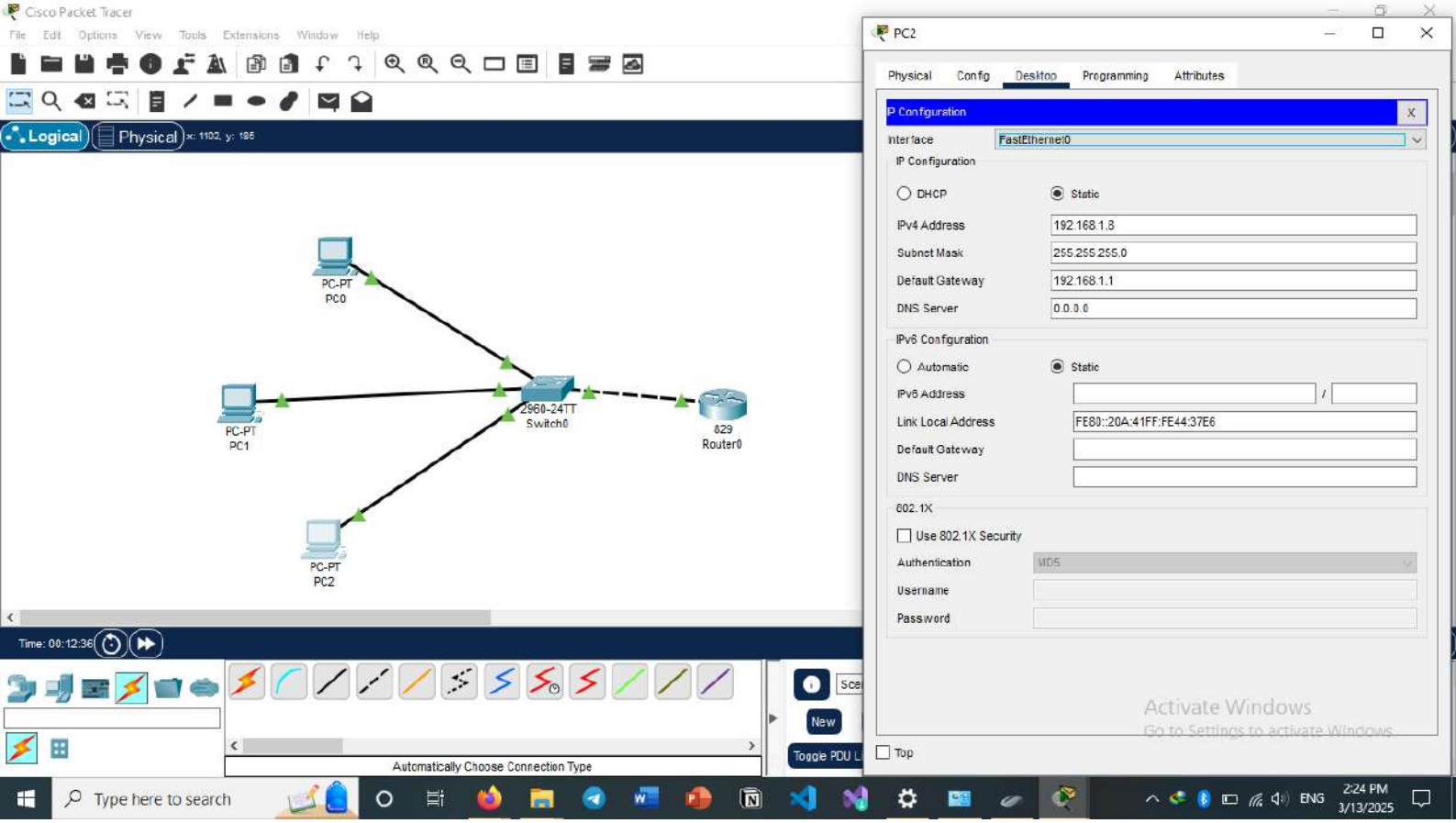
~~Q5~~ Q5 answer :-

① TEMPEST Attack :-
it's an attack that exploits Electromagnetic riadation (EMR) emitted by electronic device such Computers monitors and keyboards, and even Cables, attackers Can Capture these emissions remotely and reConstruct the data being processed, allowing attacker to eavesdrop on keystrokes and steal Sensitive information.

→ Solution : 1- using shielded Cables and devices that blocks (EMR) emissions.
2- use TEMPEST-certified equipment that limits (EMR)

② An evil twin attack:
This happens when an attacker sets up a fake wi-fi hotspot with the Same name as a real Public wi-fi network since victims Connect to the fake network, The attacker ~~interrupt~~ intercept data of the users.

→ Solution:- ① avoid Public wifi networks, Especially those without Passwords ② use a VPN to encrypt your Data


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical
Physical
PC-PT PC0
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IP Configuration
Interface FastEthernet0
IP Configuration
DHCP Static
IPv4 Address 192.168.1.8
Subnet Mask 255.255.255.0
Default Gateway 192.168.1.1
DNS Server 0.0.0.0
IPv6 Configuration
Automatic Static
IPv6 Address
Link Local Address FE80::20A:41FF:FE44:37E6
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication MD5
Username
Password
Top
Activate Windows
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