



**COMSATS University Islamabad, Lahore Campus**  
Block-B, Department of Electrical and Computer Engineering  
COMSATS University Islamabad, Lahore Campus 1.5KM Defence Road, Off Raiwind Road, Lahore

**Complex Engineering Problem**

Course Title:	Data Communication & Computer Networks				Course Code:	CPE314	Credit Hours:	4(3,I)
Course Instructor/s:	Modassir Ishfaq				Programme Name:	BCE		
Semester:	6 <sup>th</sup>	Batch:	Fa20	Section:	A&B	Date:		
Time Allowed:	Specified in Table 1				Maximum Marks:	50		
Student's Name:					Reg. No.			

You have been hired as a network engineer by Rukhsana Memorial Trust Hospital. Your responsibility is to configure the network as per their requirements which are mentioned below. The network topology that is already in place is shared in Fig. 1. Following are some key points that must be noted before you start configuring the network:

- There are 6 areas in the topology, one being the backbone area. Your employer wants you to configure multi-area OSPF as a routing protocol with efficient route summarization to reduce routing overhead.
- All WAN links should be configured with different bandwidths.
- All WAN links in the topology must be configured using public IP v4.0 class B addresses.
- All LANs must employ private IP v4.0 class B addresses.
- All servers must use static IP v 4.0 addresses.
- Static Network Address Translation must be configured for all the servers in Area 2, so that they are inaccessible when contacted on their private IP v4.0 addresses for added security.
- All end systems in the network topology must lease their IP addresses from the DHCP server in Area 2.
- HTTP server and DNS server in Area 2 must be properly configured so that all other hosts can request an HTML page from HTTP server by using both URL and IP address.
- In Area 1, VLANs must be configured for the network connected to Router 14 such that PC11, PC16, PC19 belong to VLAN named Administrative\_staff, PC12, PC15, PC18 belong to VLAN named Medical\_staff and PC13, PC14, PC17 belong to VLAN named Accounts\_Staff. These workstations should be able to access the rest of the network if they are not specifically restricted.
- LAN in Area 3 must be secured, and no unauthorized personnel/rogue hosts should be able to connect to the network.
- LAN in Area 5 should not be able to access web service provided by HTTP server in Area 2.
- LAN connected to Router 18 must not be able to Access PC1's network in Area 4

Design the network as per the requirements illustrated above using CISCO Packet Tracer.

Following items are included in the deliverables:

**Table 1**

S. No.	Deliverables		Key notes	Submission Date
1	Simulation / Packet Tracer Implementation		File	09-06-2023
2	Final Report		<b>As per requirement</b>	09-06-2023
	A	Table of Contents / List of Figures must be present	Proper ToC using MS Word features	
	B	Comprehensive Implementation Details	For each set of requirements	
	C	Connectivity Verification Report	Trace routes/pings	
	D	Servers' (HTTP, DNS, DHCP) operability report	Configuration details + screenshots illustrating they're operational	
	E	Challenges/Difficulties	If applicable	
	F	Suggestions for alternative implementation methods		
	G	Must include an Appendix for commands executed on CISCO devices & servers		

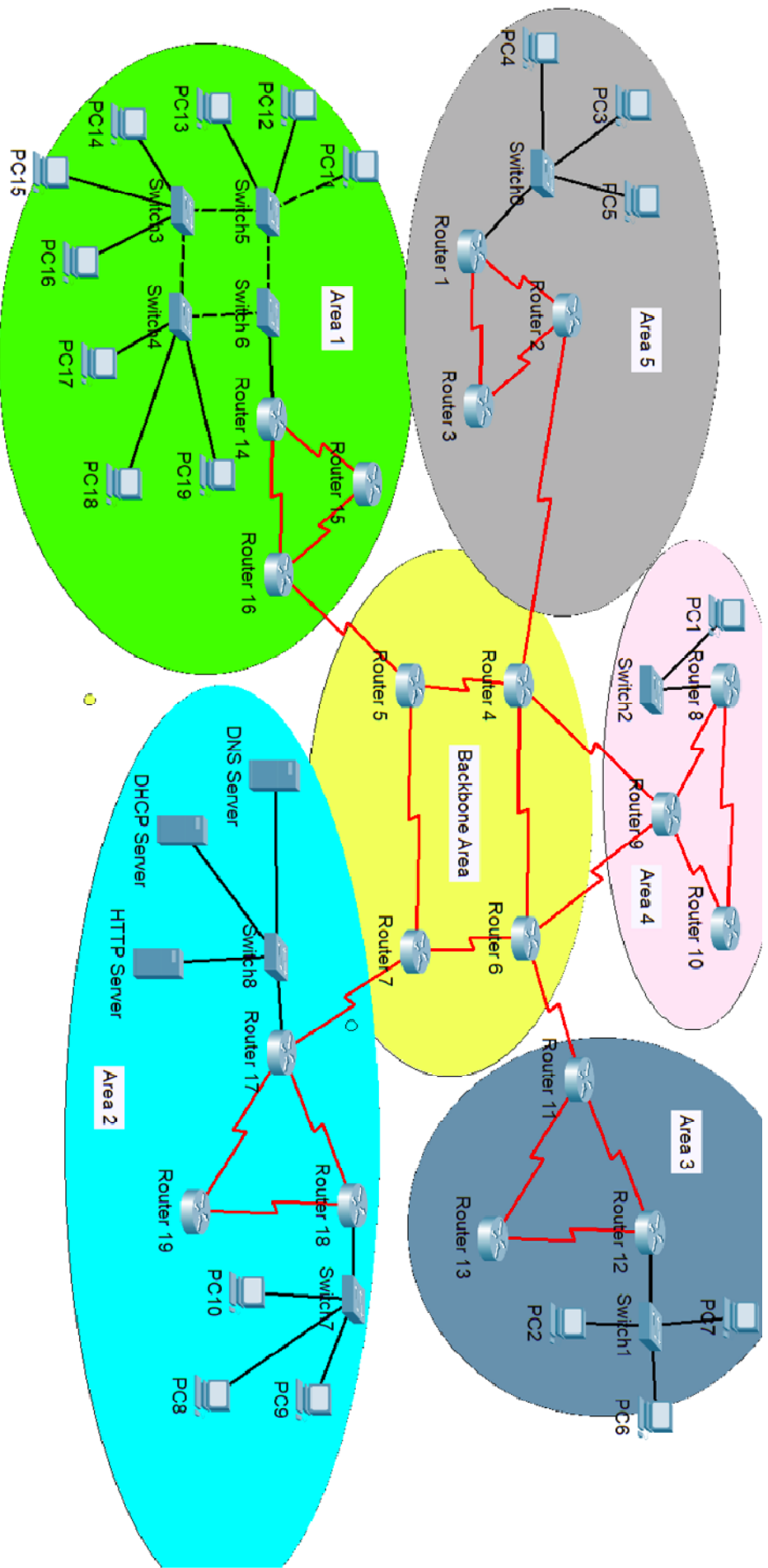


Fig 1. Network Topology