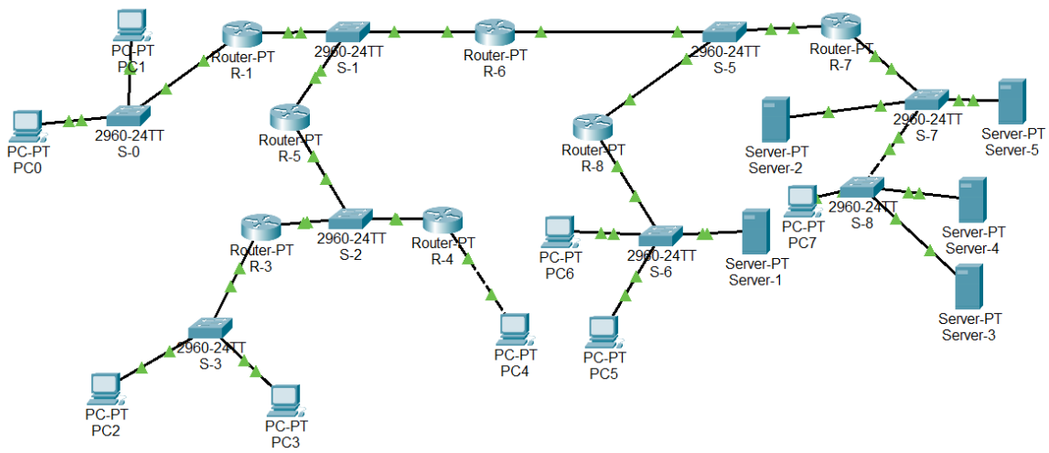
Bangladesh Army University of Engineering & Technology (BAUET)

Department of Computer Science and Engineering (CSE)

B.Sc. Engg. 3rd Year 1st Semester Complex Engineering Assignment, Summer-25

Course Code : CSE-3104
Course Title : Computer Network Laboratory
Submission Deadline: 16 November, 2025

Consider the network topology diagram for the following questions:



Q1. Use the given multi-router network topology and the IP block 192.168.10.0/16 to perform the following tasks: **[4 Marks]**

a) Identify all subnets (LANs and router links) and determine host requirements.
b) Design an efficient VLSM addressing scheme for the entire network.
c) Assign IP addresses to all router interfaces, switches, PCs, and servers.
d) Document your IP plan in a table showing device, interface, IP, subnet mask, and gateway.
e) Verify connectivity using ping and show ip interface brief.

Q2. Configure different routing protocols in the given network. **[4 Marks]**

a) Apply OSPF on routers R1, R3, and R5 using Area 0 to connect the left-side LANs (PC0–PC3).
b) Apply EIGRP on routers R4, R6, and R8 using AS 100 to manage the central LANs (PC4–PC6).
c) Apply BGP on R7 using AS 200, and establish eBGP peering between R7 and R6.
d) Advertise all server networks from R7 through BGP, and configure route redistribution between OSPF–EIGRP on R4 and EIGRP–BGP on R6.

Q3. On switches S-0, S-3, S-7, and S-8, create the following VLANs: **[4 Marks]**

i. VLAN 10 – Admin
ii. VLAN 20 – Faculty
iii. VLAN 30 – Students
iv. VLAN 40 – Servers

a) Assign VLANs to specific ports connecting PCs and servers according to their function.
b) Configure Inter-VLAN routing using the nearest router (Router-on-a-Stick configuration).
c) Verify VLAN functionality by testing intra-VLAN and inter-VLAN communication using `ping`.
d) Document VLAN ID, port assignments, and IP configurations in a summary table.

Q4. Configure the following servers in the network: **[3 Marks]**

i. Server-1: HTTP (Web Server)
ii. Server-2: DNS Server
iii. Server-3: DHCP Server
iv. Server-4: FTP Server
v. Server-5: Email Server

a) Configure DHCP to automatically assign IPs to client PCs in VLAN 30.
b) Set up DNS records to map domain names (e.g., `www.networklab.com`, `ftp.networklab.com`) to corresponding server IPs.
c) Verify:

i. PCs receive IPs automatically from the DHCP server.
ii. Users can access the web page hosted on Server-1 via browser using the DNS name.
iii. FTP and Email services function properly between client PCs and respective servers.

d) Write a short explanation of how these protocols work together in a practical enterprise network.