**Computer Networking 1 – M1I124450**

**Group 1 - Time Allowed: 90 minutes**

**Practical Test – Trimester A January 2024**

**Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Student ID : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

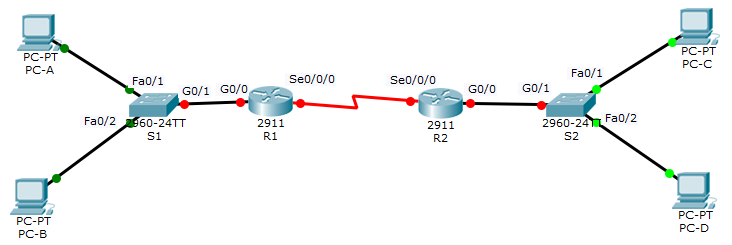
**Date & Time : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PART 1: Packet Tracer Network Implementation (60 marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device name** | **Interface name** | **IP address** | **Subnet mask** | **Default gateway** |
| R1 | G0/0 | 172.17.10.1 | 255.255.255.0 |  |
|  | Se0/0/0 | 172.17.20.1 | 255.255.255.252 |  |
| R2 | G0/0 | 172.17.30.1 | 255.255.255.0 |  |
|  | Se0/0/0 | 172.17.20.2 | 255.255.255.252 |  |
| S1 | Vlan 1 | 172.17.10.3 | 255.255.255.0 |  |
| S2 | Vlan 1 | 172.17.30.3 | 255.255.255.0 |  |
| PC-A |  | 172.17.10.254 | 255.255.255.0 | 172.17.10.1 |
| PC-B |  | 172.17.10.253 | 255.255.255.0 | 172.17.10.1 |
| PC-C |  | 172.17.30.254 | 255.255.255.0 | 172.17.30.1 |
| PC-D |  | 172.17.30.253 | 255.255.255.0 | 172.17.30.1 |

Table 1: IP Addressing Information

**Step 1:** Create the network topology below in Packet Tracer. Name the Packet Tracer file with your full name and matric number (student ID). Use the same equipment models, links, names and interfaces as shown below. (5 marks)



Note: R1 and R2 are 2911 model routers and by default they do not have any serial interfaces. In order to install the required serial interfaces follow the steps outlined below:

* Click on the router, and select the “Physical” tab form the top menu. Click on the power switch of the router to switch it off.
* From the “MODULES” list to the left, click on “HWIC-2T”.
* At the bottom right hand side corner, the serial interface module will appear. Drag and drop it in the first available slot of the router from the right hand side.
* Click on the power switch of the router to switch it on.

**Step 2:** Configure all devices according to the following instructions.

PCs

* Assign display names according to the diagram. (1 marks)
* Configure IP addresses, subnet masks and default gateways according to Table 1. (6 marks)

Routers

* Configure hostnames according to the diagram. (1 mark)
* Configure IP addresses to all appropriate interfaces according to Table 1 and activate them. Use clock rate of 128000. (9 marks)
* Disable DNS access. (1 mark)
* Configure the following MOTD: ‘Unauthorized access prohibited: Group-1’. (1 mark)
* Configure the password ‘cisco12’ for Privileged Executive mode. (1 mark)
* Configure the password ‘cisco13’ for the console connection. (1 mark)
* Configure the password ‘cisco14’ for all available VTY lines. (1 mark)
* Configure RIPv2 on both R1 and R2, in order to establish full connectivity. R1 and R2 should not summarize any routes during their routing operations. (12 marks)
* Configure R1 and R2 with passive interfaces where appropriate. (2 marks)

Switches

* Configure hostnames according to the diagram. (1 mark)
* Configure VLAN 1 addresses according to Table 1 and activate them. (1 mark)
* Disable DNS access. (1 mark)
* Configure the following MOTD: ‘Unauthorized access prohibited: Group-1’. (1 mark)
* Configure the password ‘cisco15’ for Privileged Executive mode. (1 mark)
* Configure the password ‘cisco16’ for the console connection. (1 mark)
* Configure the password ‘cisco17’ for all available VTY lines. (1 mark)

**Step 3:** Ping between all PCs. All pings should be successful. (12 marks)

**PART 2: VLSM Design (40 marks)**

As a network administrator you have been asked to create multiple subnets out of the 172.16.0.0/23 network address using VLSM to meet the following requirements. All the below subnet sizes include all IP addresses needed, network and broadcast.

* Subnet A: 90 total IP addresses.
* Subnet B: 40 total IP addresses.
* Subnet C: 25 total IP addresses.
* Subnet D: 4 total IP addresses.

Fill the following required information:

Subnet A Network Address : 172.16.0.0 (2)

Subnet Mask (Prefix: /) : /25 (1)

Subnet Mask (Decimal) : 255.255.255.128 (2)

Broadcast Address : 172.16.0.127 (2)

Number of IP Addresses : 127 (1)

First Usable IP Address : 172.16.0.1 (1)

Last Usable IP Address : 172.16.0.126 (1)

(10 marks)

Subnet B Network Address :172.16.0.128 (2)

Subnet Mask (Prefix: /) : /26 (1)

Subnet Mask (Decimal) : 255.255.255.192 (2)

Broadcast Address : 172.16.0.191 (2)

Number of IP Addresses :63 (1)

First Usable IP Address : 172.16.0.129 (1)

Last Usable IP Address : 172.16.0.190 (1)

(10 marks)

Subnet C Network Address : 172.16.0.192(2)

Subnet Mask (Prefix: /) : /27 (1)

Subnet Mask (Decimal) : 255.255.255.224 (2)

Broadcast Address : 172.16.0.233(2)

Number of IP Addresses : 31 (1)

First Usable IP Address : 172.16.0.193 (1)

Last Usable IP Address : 172.16.0.223 (1)

(10 marks)

Subnet D Network Address : 172.16.0.224 (2)

Subnet Mask (Prefix: /) : /30 (1)

Subnet Mask (Decimal) : 255.255.255.252 (2)

Broadcast Address : 172.16.0.227 (2)

Number of IP Addresses : 3 (1)

First Usable IP Address : 172.16.0.225 (1)

Last Usable IP Address : 172.16.0.226 (1)

(10 marks)