**THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY**

**DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

**FIRST SEMESTER EXAMINATION 2022**

**CS413 NETWORKING III**

**MATHS & COMPUTER SCIENCE –
YEAR 4 (BSCS)**

**TIME ALLOWED:     THREE (3) HOURS**

**INFORMATION FOR STUDENTS**:

1. You have **TEN (10)** minutes to read the paper. You must **NOT** begin answering the questions during this time.

2. This is a closed book exam, only drawing instruments and calculators are allowed. No **ELECTRONIC DEVICES PERMITTED**.

3. There are 5 questions in this paper. Answer **ALL** questions.

4. All questions carry equal marks as shown. The paper is worth 50 marks.

5. If you are found cheating in the examination, the penalties specified by the University shall apply.

6. All **MOBILE** phones must be turned off before the start of the examination and remain **OFF** during examination period.

# QUESTION ONE: Subnetting and IP Addressing [10 Marks]

For the network setup shown below (see **APPENDIX A**), the Server LAN is on the **172.16.0.0/16** network with all the addressing details shown. The remaining network will be assigned addressing information from the **202.38.10.0/24** network. Assuming 3 bits will be borrowed for subnetting, i.e. a /27 prefix, subnet the network and show your address plan for the rest of the unaddressed network.
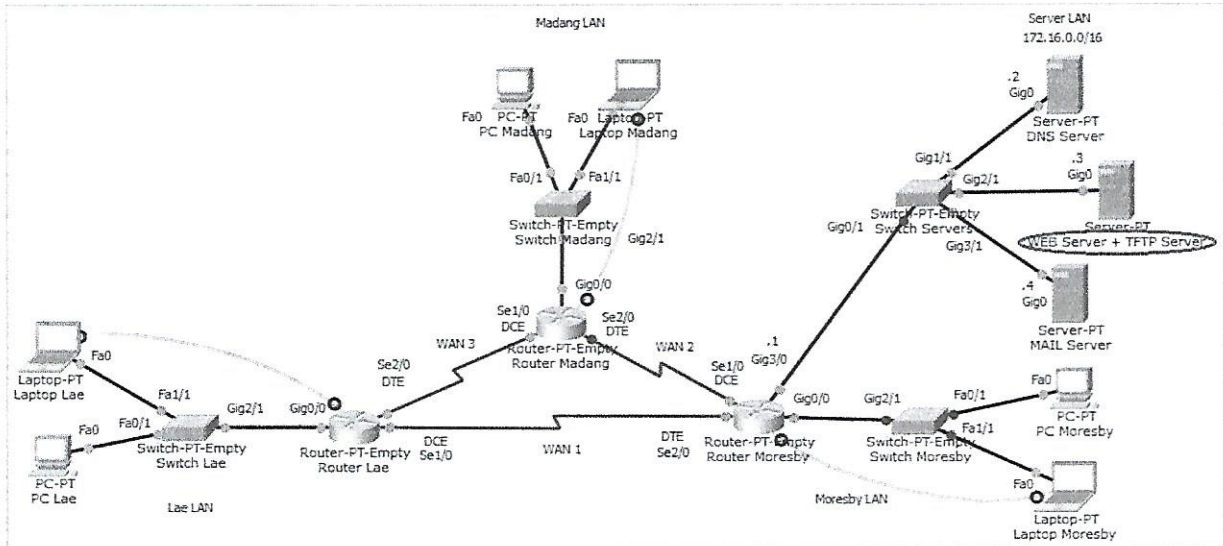


# QUESTION TWO: Router Configuration [10 Marks]

Continuing from Question 1 above, show your configuration script for the **Moresby router alone** using addressing information from your address plan in Question 1. The additional information you need are as follows:

- secret (encrypted) password: class
- all other passwords: cisco
- routing protocol: RIPv2

# QUESTION THREE: Router Administration [10 Marks]

In the network setup for Question 1, there is a TFTP Server shown highlighted. Assume that the network was fully operational (**you have configured all three routers according to your address plan in Question 1 and all three routers use RIPv2 for dynamic routing**). Assume further that the Lae router had a backup configuration file on the TFTP Server named Lae-Confg. If the Lae router's configuration file became corrupted so that Lae lost connection with the rest of the network:

a) **Provide a detailed list of all the steps necessary** to restore Lae router's configuration from the backup. The steps should be for a **minimum configuration** to minimize router downtime (i.e., bring the router back up in the shortest time possible) and should include **only explanations of what you would do and not the actual router commands involved**.

b) For the steps you have outlined in (a) above, show now the commands you would actually use for:

i) The minimum router configuration required to establish connectivity with the TFTP server.

ii) Restoring the Lae router's configuration using the backup.

## QUESTION FOUR: Password Recovery [10 Marks]

Assume the three routers used in Question 1 are Cisco 2600 routers, and that the previous Network Administrator left without leaving behind copies of the privileged mode passwords. For just the Moresby router, **provide a sequential list of all the steps necessary** to recover the password. The steps should include **both commands and detailed explanations** so that what you are doing is clearly explained.

## QUESTION FIVE: Troubleshooting [5 + 5 = 10 Marks]

a) Assume the network setup in Question 1 is fully operational according to your addressing plan and using RIPv2 for dynamic routing. Next, assume that WAN 1 (the serial link between Lae and Moresby) goes down and your **show interface serial1/0** command issued on the Lae router displayed a "**Serial1/0 is up, line protocol is down**" display. If the IP addresses on both ends of the connection (S1/0 on Lae and S2/0 on Moresby) are properly configured, what two issues would you suspect as the possible cause and describe how you would go about resolving your suspected issues.

b) Assume the network setup in Question 1 is fully operational according to your addressing plan with RIPv2 configured for dynamic routing. The Lae router's preferred path to the Server LAN will be via WAN 1. If WAN 1 goes down for some reason,

i) Describe Lae router's reaction to this outage.

ii) Show the contents of the display/entry line for the Server LAN on the Lae router's routing table in response to a "**show ip route**" command and explain what each entry means.

## END OF EXAMINATION