THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND COMMUNICATIONS ENGINEERING

SECOND SEMESTER EXAMINATION 2021

EE482 ADVANCED DATA NETWORKS

ELECTRICAL & COMMUNICATIONS ENGINEERING – YEAR 4 (BEEC)

TIME ALLOWED: THREE (3) HOURS

INFORMATION FOR STUDENTS:

1. You have **TEN (10)** minutes to read the paper.
   You must **NOT** begin answering 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: Routing and Troubleshooting [3+2+1+4=10]

a) For the network setup shown for Question 4, assume 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 are properly configured, what would you suspect as the possible cause and describe how you would go about resolving your suspected issue.

b) RIPv1 is a classful routing protocol while RIPv2 is classless. For the network setup shown for Question 4,

   i) list the networks that can be advertised with RIPv1 on the Lae router
   ii) list the networks that can be advertised with RIPv2 on the Lae router
   iii) which of these two routing protocols can be used on a VLSM network?

c) For the network setup shown for Question 4, assume the Lae router's preferred path to the Server LAN is via WAN 1. If WAN 1 goes down for some reason, describe Lae router's reaction to this outage if it had RIP configured?

d) For the network setup shown for Question 4, assume RIP was configured on the Lae router and the router's preferred path to the Moresby LAN was via WAN 1. Show the contents of the display/entry line for the Moresby LAN on the Lae router's routing table in response to a "**show ip route**" command and explain what each entry means.

QUESTION TWO: VLAN Configuration [10]

Assume that you are implementing the LAN setup shown below and the network address you will use is 192.168.10.0/24.
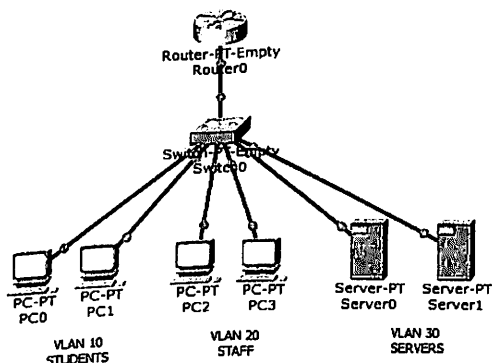
Assuming that there will be no inter-VLAN access (initially), show your VLAN configuration for the switch beginning with the prompt Switch>.

The Switch ports used for the Student VLAN are Fast Ethernet ports fa5/0 and fa6/0, the Switch ports used for the Staff VLAN are also Fast Ethernet ports fa3/0 and fa4/0, and the Switch ports used for the trunk to the router and the Server VLAN are Gigabit Ethernet ports gi0/0, gi1/0 and gi2/0 respectively.

## QUESTION THREE: ROUTER Configuration [4+6=10]

Continuing from Question 2 above, **assume now that only Staff are permitted Internet access (via the Web and DNS servers), meaning <u>only</u> Staff access to the Server VLAN is permitted.**

a) List down <u>all</u> the changes you need to make to facilitate this new/additional requirement.

b) Using your list in (a) above as guide, show the configuration for your router starting with the Router> prompt.

Note that the router has a single Gigabit Ethernet port (router-on-a-stick). Use subnet addresses 192.168.10.32/27 for the Student VLAN, 192.168.10.64/27 for the Staff VLAN, and 192.168.10.96/27 for the Server VLAN. Select a suitable number for the Standard or Extended ACL you use.

QUESTION FOUR: Router Administration [10]

In the network setup below, there is a TFTP Server shown highlighted.
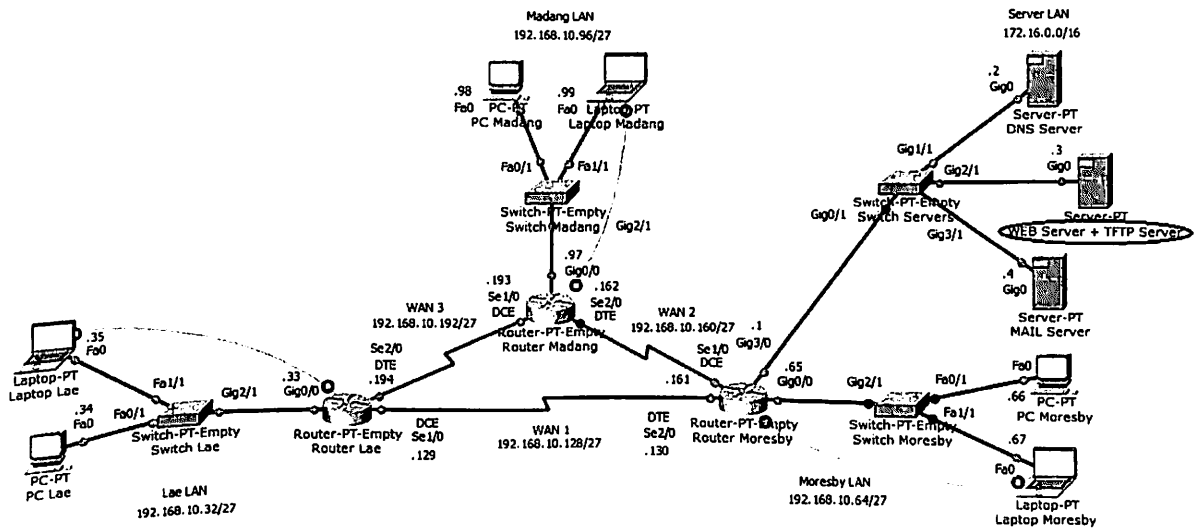
Assume that the Lae router has a backup configuration file on the TFTP Server named Lae-Confg. If the Lae router's configuration file becomes corrupted so that Lae loses connection with the rest of the network, **provide a detailed list of all the steps necessary** to restore Lae router's configuration 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 **both commands and detailed explanations** so that what you are doing is clearly explained.

QUESTION FIVE: Password Recovery [10]

For the network shown in Question 4 above, assume that the previous Network Administrator left without leaving behind copies of the privileged mode passwords for the three routers. For just the Lae router at least, **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.