TNE20002/TNE70003– Sample Skills Exam (Paper A)

Name: _____ **Student ID:** _____

Sem/Year: Big Bang, Sample Paper A **Duration:** 2 hours (No reading time)

Questions about the exam may only be asked during the first 10 minutes of the exam, no questions will be answered following this time

The routers and switches have been checked to ensure that they have no pre-existing configuration and a valid IOS installed on the flash. It is your responsibility to ensure you do not erase the IOS operating system.

If you believe there to be a hardware error with the devices, determining this is part of the exam. You need to run the necessary tests on the device to confirm your suspicion **before** informing the Exam Supervisor. You must demonstrate how you determined there to be a Hardware error. The devices have been tested prior to the exam so an error is unlikely. If there is no hardware error you will not be granted any extra time.

NOTE:	**Do not assign any passwords to your switches/router unless specifically stated within the exam paper, doing so will result in a FAIL**
NOTE:	Blank pages have been provided following this page for you to write on, you **MUST** leave these pages attached to your exam script
NOTE:	You **MUST NOT** write any details into your Hand Written Lab Journal during the exam

---

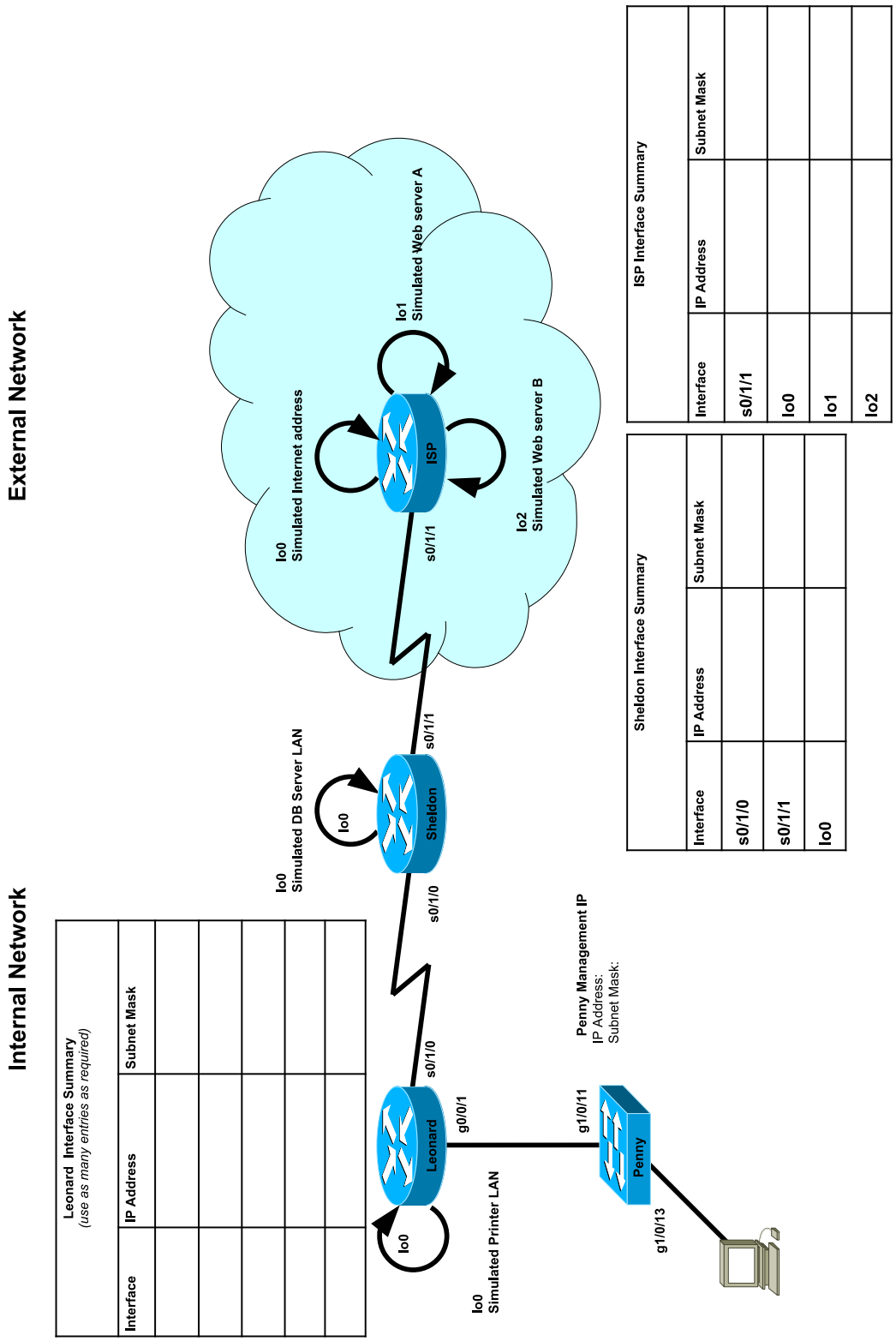
Part A – Scenario

You are installing a small corporate network that uses two company routers and a switched network using VLANs. The company is deployed using the private address space. You are required to configure the network to provide DHCP service to part of the internal network, provide Internet access using NAT, connect to the Internet using PPP, and to implement a simple access control security policy. You are also required to implement the ISP router configuration to simulate Internet access.

Part B – Network Drawing

The following diagram illustrates the network configuration for this Exam.

(you may wish to record IP addresses on the topology diagram)



Part C – Network Information Allocation

The section below contains network VLAN Information, subnet information and device IP address information.

Rajesh VLAN

VLAN Name: Raj
VLAN Number: 37
Subnet Information: `192.168.0.0/23`

Bernadette VLAN

VLAN Name: Bernadette
VLAN Number: 83
Subnet Information: `192.168.2.0/25`

Amy VLAN

VLAN Name: Amy
VLAN Number: 82
Subnet Information: `192.168.2.128/27`

Management VLAN

This VLAN is to be used as the switch management VLAN

VLAN Name: *default (VLAN1)*
VLAN Number: 1
Subnet Information: `192.168.2.184/29`

Other Network Information

Other subnet information for your corporation includes:

Network Name: Database Server LAN
Subnet Information: `192.168.2.160/28`

Network Name: Printer LAN
Subnet Information: `192.168.2.176/29`

Network Name: Internal Serial Link
Subnet Information: `192.168.2.192/30`

Network Name: Company/ISP Serial Link
Subnet Information: `34.157.25.104/30`

Simulated Network Addresses

Simulated Internet Address: 65.0.38.1/32
Simulated Web Server A Address: 121.83.0.82/32
Simulated Web Server B Address: 121.82.60.37/32

Part D – Device Configuration Requirements

Basic Device Configuration

- Configure the **Sheldon** Router with a Message of the Day (MOTD) which includes your student ID and surname
- Configure device names on all devices
- Enable telnet access on the **Leonard** and **Sheldon** routers using a telnet password of **bigbang**
- For testing purposes, enable the HTTP server on all three routers – `ip http server`

Switch VLAN Configuration

- Create and name VLANs on the switch
- Assign switch ports **g1/0/13-16** to the **Raj** VLAN
- Assign switch ports **g1/0/17-20** to the **Bernadette** VLAN
- Assign switch ports **g1/0/21-24** to the **Amy** VLAN
- Configure switchport security on **Raj** VLAN access ports with MAC address sticky; a maximum of three connected devices; and violation mode "protect"
- Configure switchport security on **Bernadette** VLAN access ports with MAC address sticky; a maximum of five connected devices; and violation mode "protect"
- Configure a single management IP address on the switch. The address **must** be the **second-last** useable IP address in the **Management** subnet

Router Interface Configuration

- Configure all interfaces (real and loopback) on the routers as per the network diagram and address allocation tables
- The **Leonard** router **must** support all four VLAN subnets using 802.1Q encapsulation
- Unless specified below, all router interfaces **must** use the **last** usable IP address in the allocated subnet

  Sheldon(s0/1/0) Configure the first usable IP address

  ISP(s0/1/1) Configure the first usable IP address

  The Serial Port at the other end of the links listed above will use the first usable IP address in the allocated subnet

DHCP

- Configure DHCP services on the **Sheldon** router for the **Raj** and **Amy** VLANs only
- Ensure that DHCP requests are forwarded to **Sheldon** by the **Leonard** router
- The last four usable addresses in DHCP managed subnets are excluded from the DHCP address pool
- Use DHCP to advertise the default gateway for the subnet

Static Routing

- Install a static default route to the **ISP** router on **Sheldon**
- Install a static route for all public IP addresses used by the organisation on **ISP** pointing to the **Sheldon** router

Routing Protocol

Configure the OSPF routing protocol as per the following instructions:

- The **ISP** router **MUST NOT** participate in OSPF
- All internal networks must be learnt using OSPF
- Propagate the static default route to **Leonard** using OSPF
- Do **NOT** advertise the ISP link network using OSPF
- Advertise all networks in the default (base) area

NAT and PPP

- The **Sheldon** router is to be configured to connect to the **ISP** router using PPP with CHAP authentication and a password of **nasa**
- NAT must be configured on the **Sheldon** router to provide all private network hosts (**192.168.0.0/16**) access to the Internet
  - Use a NAT Pool Public Address range of **154.82.105.0/24**
  - Configure the NAT services as PAT (Overloaded NAT)

Access Control

Configure your network using **named ACLs**

Use the following security considerations for PCs in the **Raj** VLAN:

- Permitted **ONLY** HTTP access to **Simulated Web Server A**
- Permitted **ONLY** ping access to **Simulated Web Server B**
- Permitted **ONLY** HTTP and HTTPS access to the **Printer LAN**
- Permitted Internet access

Use the following security considerations for all access to the **Database Server LAN**:

- Full access to all addresses in the **Management** VLAN
- Permitted **ONLY** HTTP access to all other internal addresses
- Permitted **NO** access to devices outside the corporate network

Configure telnet access restrictions to the **Leonard** and **Sheldon** routers:

- All devices in the Management VLAN are permitted telnet access to both routers
- All PCs in the **Raj** VLAN permitted telnet access to the **Leonard** router
- No other devices permitted telnet access

Part E – Testing

It is your responsibility to devise a testing regime to check that you have properly met all the network requirements listed in this Exam Paper. This should include – but not be limited to – ensuring connectivity between all devices where no access control should be applied, ensuring blocking communications as required by the access control policy, and confirming that all required services are functioning as per the required specifications

IMPORTANT

You must correctly configure the devices according to instructions in this exam paper in order to pass. Testing your network is your responsibility and part of the exam. Also note that you will fail the exam if you have not configured the correct subnets on the correct interfaces, you have allocated incorrect host addresses to router interfaces, you have used the wrong VLAN scheme, or you have used the wrong routing protocol

When you conclude your exam, please place all Routers and Switches into `enable` mode

End of Exam