UNIVERSITY OF GHANA

B.SC INFORMATION TECHNOLOGY, FIRST SEMESTER EXAMINATIONS: 2017/ 2018

CSIT 411: ADVANCED NETWORKING PRINCIPLES (3 CREDITS)

INSTRUCTIONS:

Answer question one (1) any other three (3) questions. Each question carries equal marks

TIME ALLOWED: *TWO AND A HALF (2½) HOURS*

Q1).

I. Briefly explain the term broadcast storm.

[3 Marks]

I. Briefly explain how switching loops develop.

[3 Marks]

I. For each layer in the Hierarchical Network Design, state its specific function.

[3 Marks]

I. Name the technology is required when switched networks are designed to include redundant links

[2 Marks]

I. Explain briefly the term failure domain.

[3 Marks]

I. Differentiate between in-band and out-of-band-management

[3 Marks]

I. Name the three access layer switch features that are considered when designing a network

[3 Marks]

I. State two functions of a router

[4 Marks]

I. State the purpose of the purpose of Spanning Tree Protocol

[3 Marks]

I. Name the three components are combined to form a bridge ID as part of the operations in Spanning Tree Protocol

[3 Marks]

Q2A) Briefly describe three (3) issues that could arise when *redundancy* is introduced in layer 1 of the OSI model.

[9 Marks]

Q2B) What is the use of a **First Hop Redundancy Protocol**?

[1 Mark]

Q2C) Complete the table below indicating, (YES/NO), whether or not a PAgP channel is established based on the configuration of each side of a link. S1 and S2 represent two switches.

S1	S2	Established?
On	On	
Auto/Desirable	Desirable	
On/Auto/Desirable	Not Configured	
On	Desirable	
Auto/On	Auto	

[5 marks]

Q2D) What Cisco CLI commands can be used to achieve the following?

I. Display any ports with security activated

[1 Mark]

I. Display all secure MAC addresses configured on all switch interfaces

[1 Mark]

I. Display information on directly connected devices, including Device ID, local interface that the device is connected to, capability, platform, and Port ID of the remote device.

[1 Mark]

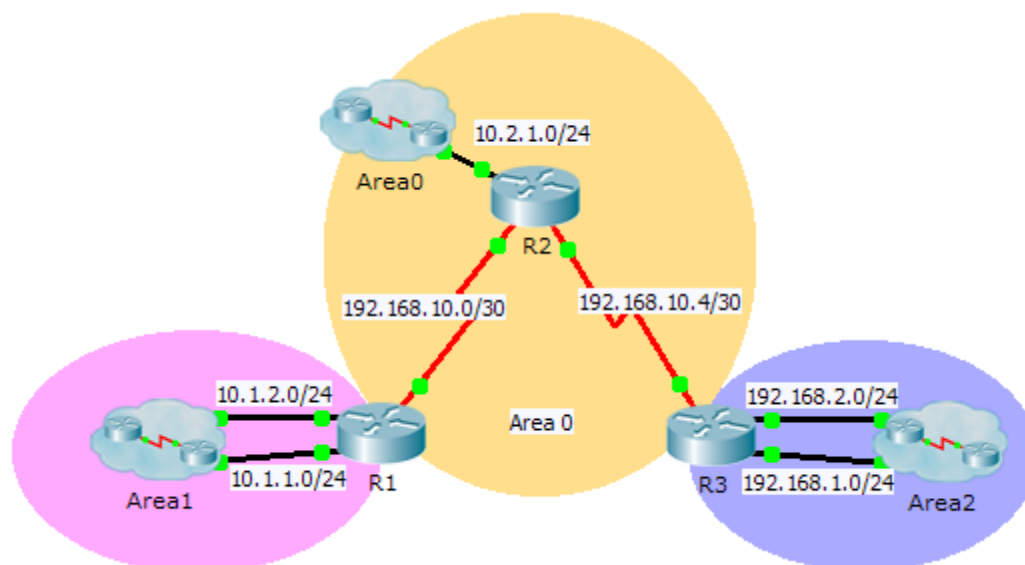I. Display routing table information

[1 Mark]

I. Display interface information, including protocol status, IP address, whether a

helper address is configured, and whether an ACL is enabled on the interface

[1 Mark]

Q3. Use the topology to answer the following questions:

Addressing Table

Device	Interface	IP Address	Subnet Mask	OSPFv2 Area
R1	G0/0	10.1.1.1	255.255.255.0	1
	G0/1	10.1.2.1	255.255.255.0	1
	S0/0/0	192.168.10.2	255.255.255.252	0
R2	G0/0	10.2.1.1	255.255.255.0	0
	S0/0/0	192.168.10.1	255.255.255.252	0
	S0/0/1	192.168.10.5	255.255.255.252	0
R3	G0/0	192.168.2.1	255.255.255.0	2
	G0/1	192.168.1.1	255.255.255.0	2
	S0/0/1	192.168.10.6	255.255.255.252	0

Q3A).

Provide the CISCO CLI command(s) that can be used to achieve the following:

    I. Configure OSPFv2 on R1, R2, R3 with a process ID of 1 and a router ID of 1.1.1.1**,** 2.2.2.2 and 3.3.3.3, respectively.

<div align="right">[3 Marks]</div>

    I. Advertise each directly connected network in OSPFv2 on R1, R2, R3

<div align="right">[12 Marks]</div>

Q3B).

    I. Which router(s) are internal routers?

<div align="right">[1 Mark]</div>

    I. Which router(s) are backbone routers?

<div align="right">[1 Mark]</div>
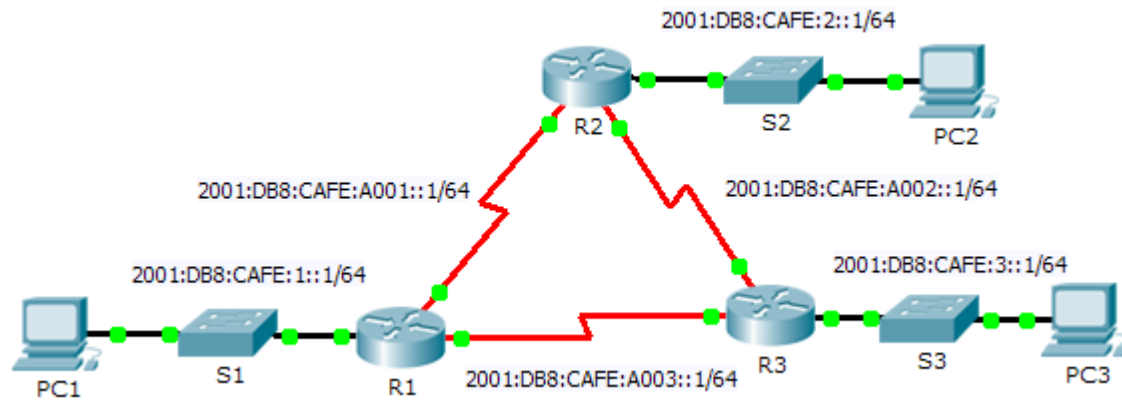
    I. Which router(s) are area border routers?

<div align="right">[1 Mark]</div>

    I. Which router(s) are autonomous system routers?

<div align="right">[1 Mark]</div>

I. What will be the use of an ASBR in this type of network?

Q4. Use the topology and addressing table to answer the following questions:

2001:DB8:CAFE:2::1/64

R2   S2   PC2

2001:DB8:CAFE:A001::1/64   2001:DB8:CAFE:A002::1/64

2001:DB8:CAFE:1::1/64   2001:DB8:CAFE:3::1/64

PC1   S1   R1   2001:DB8:CAFE:A003::1/64   R3   S3   PC3

Device

	Interface	IPv6 Address	Default Gateway
R1	G0/0	2001:DB8:CAFE:1::1/64	N/A
	S0/0/0	2001:DB8:CAFE:A001::1/64	N/A
	S0/0/1	2001:DB8:CAFE:A003::1/64	N/A
	Link-local	FE80::1	N/A
R2	G0/0	2001:DB8:CAFE:2::1/64	N/A
	S0/0/0	2001:DB8:CAFE:A001::2/64	N/A
	S0/0/1	2001:DB8:CAFE:A002::1/64	N/A
	Link-local	FE80::2	N/A
R3	G0/0	2001:DB8:CAFE:3::1/64	N/A
	S0/0/0	2001:DB8:CAFE:A003::2/64	N/A
	S0/0/1	2001:DB8:CAFE:A002::2/64	N/A
	Link-local	FE80::3	N/A
PC1	NIC	2001:DB8:CAFE:1::3/64	Fe80::1
PC2	NIC	2001:DB8:CAFE:2::3/64	Fe80::2
PC3	NIC	2001:DB8:CAFE:3::3/64	Fe80::3

Provide the CISCO CLI command(s) that can be used to achieve the following:

I. Enable IPv6 routing on each router

[1 Mark]

I. Enable EIGRP for IPv6 routing on each router and use **1** as the Autonomous System number

[2 Marks]

I. Assign a router ID to each router using the following: R1: 1.1.1.1, R2: 2.2.2.2, R3: 3.3. 3.3

[3 Marks]

I. Configure EIGRP for IPv6 on each interface using Autonomous System number 1.

[12 Marks]

I. Examine neighbor adjacencies (to verify that the adjacency has been established with its neighboring routers)

I. Verify the parameters and current state of the active IPv6 routing protocol processes

[1 Mark]

I. Examine the IPv6 EIGRP routing table

[1 Mark]

Q5A). State three (3) issues that must be addressed when a Single-area OSPF network becomes too big.

[3 Marks]

Q5B). Multi-area OSPF is implemented in a two-layer area hierarchy, **Backbone Area** and **Regular Area**. State two functions of each.

[8 Marks]

Q5C). State and explain briefly 3 common WLAN threats as realized in wireless networks.

[9 Marks]