UNIVERSITY OF GHANA

B.SC INFORMATION TECHNOLOGY, FIRST SEMESTER EXAMINATIONS: 2016/2017

CSIT 411: ADVANCED NETWORKING PRINCIPLES (3 CREDITS)

INSTRUCTIONS:

Answer any four (4) questions. Each question carries equal marks

TIME ALLOWED:

TWO AND A HALF (2½) HOURS

1.

(a) Briefly explain the term broadcast storm? How does a broadcast storm develop?
(4 marks)

(b) What is a definition of a switching loop? What causes a switching loop?
(4 marks)

(c) How can you mitigate broadcast storms and switching loops caused in a network?
(2 marks)

(d) What is the IEEE standard for STP, RSTP and MST?
(3 marks)

(e) For each layer in the Hierarchical Network Design, state its specific function.
(3 marks)

(f) State 4 roles of a router in a network.
(4 marks)

(g) State the useful guidelines for configuring **EtherChannel**.
(4 marks)

(h) When a range of ports is being configured for **EtherChannel**, which mode will configure PAgP so that it initiates the **EtherChannel** negotiation?
(1 mark)

2.

(a) State the five categories of switches for enterprise networks giving an example for each.
(5 marks)

(b) In a single-area OSPF, if an area becomes too big, what three (3) issues must be addressed?
(3marks)

(c) List three considerations when selecting a switch equipment.
(3 marks)

(d) Explain the two methods for connecting a PC to a network device for configuration and monitoring tasks.
(4 marks)

(e) State and explain the port roles as assigned to ports by the Spanning Tree Algorithm.
(5 marks)

(f) What CLI commands can be used to achieve the following?

i. Display any ports with security activated
ii. Display all secure MAC addresses configured on all switch interfaces
iii. 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.
iv. Display routing table information
v. displays interface information, including protocol status, IP address, whether a helper address is configured, and whether an ACL is enabled on the interface

(5 marks)

3.

(a) List the three steps that is taken during a router failover process.
(3 marks)

(b) What is link aggregation?
(2 marks)

(c) State four advantages of using an **EtherChannel**.
(4 marks)

(d) State and explain the use of the different wireless frame types.
(6 marks)

(e) With the help of a flowchart, describe how CSMA/CA works.
(5 marks)

(f) State four (4) uses of a Smart WiFi Router Settings in a wireless router.
(4 marks)

(g) To ensure that neighbor adjacencies are formed in an OSPF environment what rule must OSPF Hello and Dead intervals follow?
(1 mark)

4.

(a) Describe the four OSPF network types.
(8 marks)

(b) What steps must be taken to implement a Multi-area OSPF?
(4 marks)

(c) Which command in Cisco IOS displays only the OSPF learned routes in the routing table?

(1 mark)

(d) State and explain the roles of the four (4) different types of multi-area OSPF routers.

(8 marks)

(e) List the set of commands in Cisco CLI needed to configure OSPF MD5 authentication

i. Globally **(2 marks)**

ii. Per interface basis **(2 marks)**

5.

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

(9 marks)

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

(2 marks)

(c) 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)

(d) . Using the IP subnet address 172.168.2.0/27. Calculate the following.

	Decimals	**Change to Binaries**
Subnet mask		
Network Address		
Broadcast Address		
First IP Address		
Last IP Address		
Prefix Length		

(11 marks)