Test 1: NET3011 – Advanced Switching

Winter 2012

Time: 50 minutes; Test scored out of: 45   Total Marks available: 48

(Allocation of marks is shown beside each question)

Instructions:

1. <u>BEFORE</u> answering any questions, please check that your copy of the test has all pages (as indicated in the footer at the bottom of each page). Please read all questions carefully, then answer question 0 first!

2. Be sure to **mark your name (both written and bubbled)** on the scantron answer sheet.

3. All multiple choice answers should be circled on this test paper **and** then marked on the scantron answer sheet.

4. All multiple choice questions are worth 1 mark, unless otherwise noted.

5. For multiple choice questions, if you do not find an answer which is clearly the correct choice, choose the *best* answer.

6. If you are uncertain what a question is asking, make reasonable assumptions, write those assumptions down on this test paper, and continue answering the question.

0. What is your:

NAME? _____   Student Id? _____

(Continued on next page)

1. Refer to the CLI output for ALS2 below. What implementation of spanning tree best describes the spanning-tree operational mode of the switch?

   (a) IEEE 802.1D

   (b) IEEE 802.1s

   (c) IEEE 802.1w

   (d) PVRST+

   (e) none of above

```
ALS2# show spanning-tree

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID     Priority    32769
              Address     000a.b8a9.d680
              Cost        19
              Port        9 (FastEthernet0/7)
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32769  (priority 32768 sys-id-ext 1)
              Address     0019.068d.6980
              Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
              Aging Time 300

Interface         Role Sts Cost      Prio.Nbr Type
----------------- ---- --- --------- -------- --------------------------
Fa0/7             Root FWD 19        128.9    P2p
Fa0/8             Altn BLK 19        128.10   P2p
Fa0/9             Altn BLK 19        128.11   P2p
Fa0/10            Altn BLK 19        128.12   P2p
Fa0/11            Altn BLK 19        128.13   P2p
Fa0/12            Altn BLK 19        128.14   P2p
```

2. Which STP timer defines the length of time spent in the listening and learning states
   (a) hello time
   (b) forwarding age
   (c) forwarding delay
   (d) max age
   (e) max delay

3. Which one of the following is the best bridge priority that you would configure from the CLI for a spanning-tree root switch?
   (a) 0
   (b) 1
   (c) 4096
   (d) 8192
   (e) 65536

4. Which of the following are characteristics of a properly designed campus network? Choose **all** that apply.
   (a) Modular
   (b) Flexible
   (c) Scalable
   (d) Highly available
   (e) none of the above

5. Why are hierarchical designs used with layers as an approach to network design? Pick 2.
   (a) Simplification of large-scale designs
   (b) Reduce complexity of troubleshooting analysis
   (c) Reduce costs by 50 percent compared to flat network designs
   (d) Packets that move faster through layered networks reduce latency for applications

6. Which of the following are examples of peer-to-peer applications? Choose at least two.
   - (a) Video conferencing
   - (b) IP phone calls
   - (c) Workstation-to-workstation file sharing
   - (d) Web-based database application
   - (e) Inventory management tool

7. When implementing multiple complex components, which of the following is the most efficient approach, according to Cisco's "best-practice approach to lifecycle design"?
   - (a) Implement each component one after the other, test to verify at each step
   - (b) Implement all components simultaneously for efficiency reasons
   - (c) Implement all components on a per-physical location approach.
   - (d) Let your lab partner do all the work

8. L2 control protocols (DTP, VTP, STP BPDUs, PAgP, LACP, CDP, etc) always run on:
   - (a) the default VLAN
   - (b) the native VLAN
   - (c) the management VLAN
   - (d) trunk links only
   - (e) whatever VLAN you assign for them

9. When VTP pruning is enabled, it stops:
   - (a) broadcast traffic across a trunk link if the far-end switch has no hosts in the VLAN
   - (b) DTP announcements across a trunk link if the far-end switch has no hosts in the VLAN
   - (c) VTP announcements across a trunk link if the far-end switch has no hosts in the VLAN
   - (d) all traffic/announcements across a trunk if the far-end switch has no hosts in the VLAN
   - (e) knowledge of locally configured VLANs from being propagated to other switches

10. True or False? Switches in VTP Transparent mode will only forward VTP messages belonging to their configured (ie. non NULL) domain.
    - (a) True
    - (b) False

11. Which of the following is **not** a valid load balancing criterion?
    - (a) dst-ip
    - (b) dst-mac
    - (c) src-dst-ip
    - (d) src-dst-mac
    - (e) all of the above are valid criteria

12. [3 marks] In Chapter 1 of the textbook, Cisco presents their "best-practice approach to lifecycle design". Give the name of each phase, in the correct order, and include a brief description (one line, but **clear**!) of each phase.

13. [2 marks] Give at least two **clear** reasons why 802.1Q is the preferred standard for VLAN trunking.

14. [1 mark] **Clearly** explain the difference between a "local VLAN" design and an "end to end VLAN" design.

15. [1 mark] Are DTP announcements sent over a link that is configured as "switchport mode trunk"? You must provide evidence to "prove" your answer in order to get marks!

16. [1 mark] Are Etherchannel announcements sent over the link(s) configured as "channel-group {#} mode on"? Provide evidence to "prove" your answer.

17. [2 marks] The President of your company is demanding better internet access, especially since the company has a 10G fiber link to the internet. She uses two sources for time-sensitive information: slashdot.org and www.cbc.ca. Unfortunately, only 100Mbps links are available into her office. Your boss tells you to set up Etherchannel. What is the **best** choice for number of links to bundle together, to gain maximum performance with minimum cost? Justify your answer.

18. [1 mark] **Clearly** identify a significant advantage that LACP has over PAgP.

19. [2 marks] For VTP, we say that normally a switch in Client mode can **not** modify the VLAN configuration or behavior. There are, however, two exceptions to this rule. **Clearly** identify the two circumstances when a Client switch **will** modify the configuration or behaviour. (Hint: one from lectures, one from labs [step 13 of Lab 2-1].)

20. Your colleague claims that any switch supporting 802.1q trunking must have the capacity to handle 4096 VLANs concurrently.
    A. [1 mark] From what do you suppose this claim is derived?

    B. [2 marks] Discuss the accuracy of this statement.

21. [2 marks] A colleague calls you for advice while troubleshooting at a client site. He is concerned that he can't see the VTP information in the running configuration of a switch. What do you tell him? (Give a **clear** explanation as well as any specific commands required.)

22. [3 marks] Identify the conditions required for a VTP Client device to successfully adopt the VLAN information from an adjacent VTP Server device (n.b. authentication is NOT in use).

23. [4 marks] What must be taken into consideration with respect to VTP, when Private VLANs are implemented?

24. [5 marks] **Clearly** define and distinguish the terms: *default VLAN*, *Native VLAN*, *Management VLAN*, *User VLAN*, and *Blackhole VLAN*. Be sure to include relevant L2 control protocols and any specific VLAN numbers in your definitions.

25. Consider the following configuration commands:

```
Sw(config)# vlan 201
Sw(config-vlan)# private-vlan isolated
Sw(config-vlan)# vlan 202
Sw(config-vlan)# private-vlan community
Sw(config-vlan)# vlan 203
Sw(config-vlan)# private-vlan community
Sw(config-vlan)# vlan 200
Sw(config-vlan)# private-vlan primary
Sw(config-vlan)# private-vlan association 201,202,203
Sw(config-vlan)# interface fastethernet 0/23
Sw(config-if)# switchport mode private-vlan promiscuous
Sw(config-if)# switchport private-vlan mapping 200 201,202
Sw(config-if)# interface fastethernet 0/24
Sw(config-if)# switchport mode private-vlan promiscuous
Sw(config-if)# switchport private-vlan mapping 200 202,203
Sw(config-if)# interface range fastethernet 0/1 - 2
Sw(config-if)# switchport mode private-vlan host
Sw(config-if)# switchport private-vlan host-association 200 201
Sw(config-if)# interface range fastethernet 0/3 - 4
Sw(config-if)# switchport mode private-vlan host
Sw(config-if)# switchport private-vlan host-association 200 202
Sw(config-if)# interface range fastethernet 0/5 - 6
Sw(config-if)# switchport mode private-vlan host
Sw(config-if)# switchport private-vlan host-association 200 203
```

a. [5 marks] Assume hosts **A**, **B**, ... **F** are connected to ports f0/**1**, f0/**2**, ... f0/**6**, consecutively and hosts **X** & **Y** are connected to f0/**23** & f0/**24**, all of which are "up / up". **Important**: marks will be deducted for incorrect answers so **NO** guessing!

   a.1. A ping originating from host X could successfully reach which host(s)?

   a.2. A ping originating from host Y could successfully reach which host(s)?

   a.3. A ping originating from host A could successfully reach which host(s)?

   a.4. A ping originating from host C could successfully reach which host(s)?

   a.5. A ping originating from host E could successfully reach which host(s)?

b. [2 marks] Imagine a scenario (eg. Lab 2-9) where two pVLANs configured as above are joined by a trunk. A host in the isolated pVLAN on the right side pings a Host X on the left side pVLAN. Assume the ping is successful. **Clearly** identify the 802.1Q tags that appear on the ping request and response as they travel across the trunk.