Test 1: NET3011 – Advanced Switching

Winter 2015

Time: 50 minutes; Test scored out of: 40   Total Marks available: 42
(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 instructions and all questions** carefully, then answer question 0 first!

2. This is a **closed book** test. No textbooks, notes, electronic devices, or any other aids are permitted.

3. For a laugh, check out the screen capture on the last page.

4. 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.
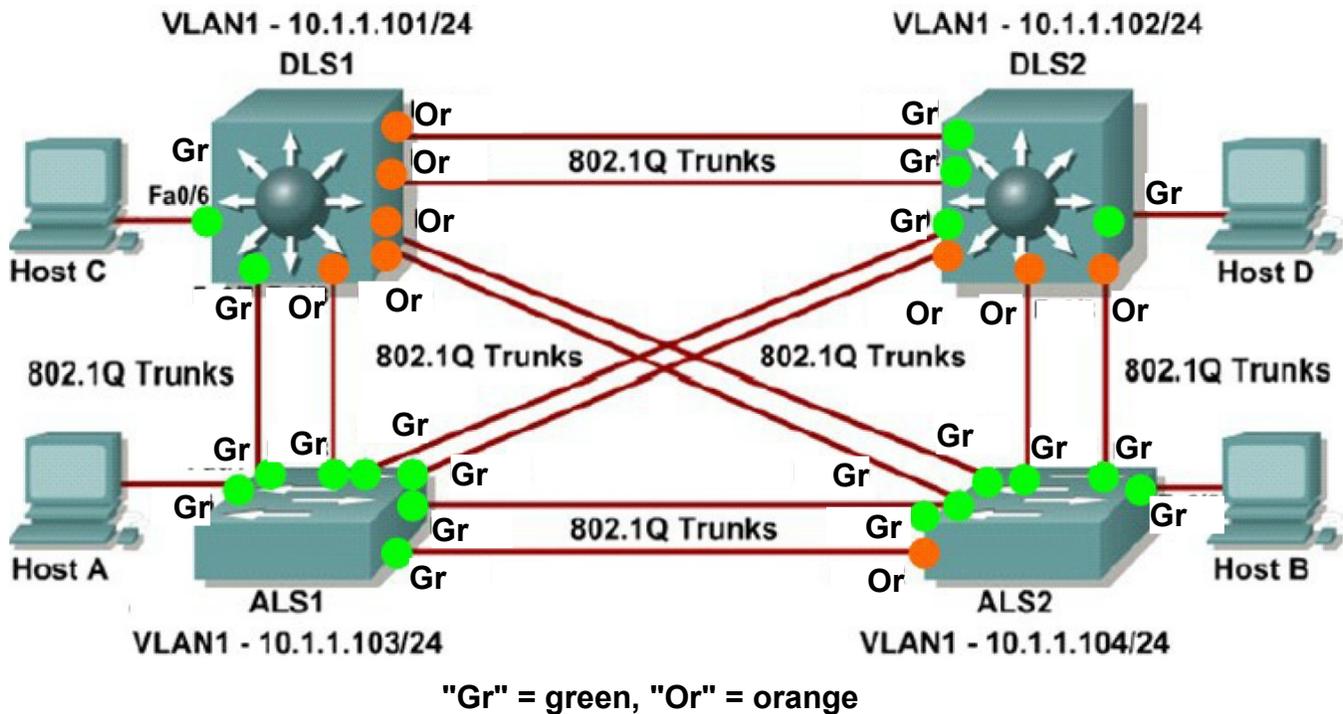
0. What is your:

NAME? ___Answers_____

(Continued on next page)

1. [2 marks] Some best practices for VLAN design are given in the textbook and slide deck. What are the recommendations for the following protocols? (One mark per pair.)

	Enabled	Disabled
DTP		X
VTP		X
ISL		X
Telnet		X

2. A. [1 mark] **Circle** the root bridge in the diagram below.

VLAN1 - 10.1.1.101/24   VLAN1 - 10.1.1.102/24

DLS1   DLS2

Or   Gr

Gr   Or   802.1Q Trunks   Gr

Fa0/6   Or   Gr   Gr

Host C   Host D

Gr   Or   Or   Or   Or   Or

802.1Q Trunks   802.1Q Trunks   802.1Q Trunks   802.1Q Trunks

Gr

Gr   Gr   Gr   Gr   Gr

Gr   Gr   Gr

Gr   Gr   802.1Q Trunks   Gr   Gr

Host A   Gr   Or   Host B

ALS1   ALS2

VLAN1 - 10.1.1.103/24   VLAN1 - 10.1.1.104/24

"Gr" = green, "Or" = orange

B. [4 marks] Identify the state of all ports in the diagram using the symbols:
    R = Root port; **D** = Designated port; **B** = Blocking

All orange = **B**; all ports on ALS1 = **D** with opposite end **R**, all remaining = **D**

3. [2 marks] **Clearly** explain the two ways that DTP and VTP are inter-dependent on Cisco switches.

DTP won't succeed if the VTP domain names aren't identical
VTP requires successful DTP negotiation for trunking if ports are dynamic auto/desirable

4. [1 mark] What is the best discount you can get on the cost of Ethernet frames?

70%, unless the close-out sale at Target has even bigger discounts.

5. [2 marks] One day, Anderson and Smith are working together in T108. Anderson connects a pair of 29XX switches and immediately gets a trunk link. Smith connects his pair of 35XX switches but does **not** get a trunk link. **All** switches are completely in their default state. Based on your own lab work and extra study, **clearly** explain the reason for these results.

Some switches (eg. Anderson's) have default values "dynamic desirable" for trunking.
Other switches (eg. Smith's) have default values "dynamic auto", which won't trunk
if they're the only switches at both ends of the link.
Also accepted (but not the main thrust of the question): 3560's support both 802.1Q
and ISL, so encap type may need to be set before trunking will succeed.

6. [2 marks] We have covered two different models or architectures for VLAN design. Identify them and provide a **clear** explanation of whether or not VTP should be used in each design.

Local (or geographic): No, not necessary since VLAN information is entirely local
End-to-End: Yes, so that VLAN information is propagated accurately to all switches

7. [2 marks] Again referring to the two models of VLAN design: **clearly** explain what method or OSI networking layer is used to connect switches far apart (different buildings) in each case.

Local: each VLAN is separate & independent, as is the subnet, so L3 or routed
End-to-End: VLANs *not* separate, so need L2 or trunked connectivity joining them

8. [2 marks] For link aggregation, **clearly** identify the two general types of load balancing algorithms. **Clearly** state when (ie. under what conditions) each one is used. [Ref: slide 5]

Hash (only a single value used, eg. source) and XOR (two values used, eg. src & dst)

9. A. [1 mark] Name 4 different LACP modes that can be configured for a channel-group.

Off,   passive   active   ON

B. [2 marks] **Clearly** identify all the different possible combinations of LACP modes and indicate whether each combination will or will not successfully form a channel. [Ref slide 26]

Off	– active / passive / On: **no** channel	On + On = channel
passive	– passive / On: **no** channel	active + passive = channel
active	– passive / active: channel	active + active = channel
On	– On: channel	anything else = no channel

10. [4 marks] Show your mastery of pVLAN concepts by implementing a simplified version on a 2960 switch which only supports <u>protected</u> ports. Draw on the diagram below and label ports to **clearly** indicate how to create the equivalent of <u>two different communities</u> which both access a file server. (Note: Different hints are available, costing 1, 2, or 3 marks.)
   (Answer on diagram)
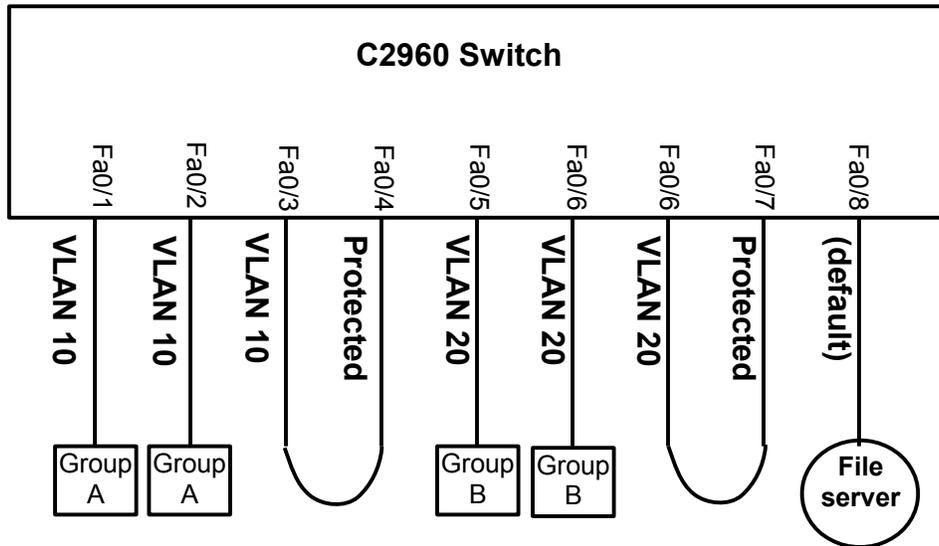
   [1 mark] Which sub-interfaces, if any, need to be configured on the server for the pVLAN?
   None, VLAN tags were *not* necessary in pVLANs except for actual trunk links.

11. [2 marks] Provide a convincing example to illustrate why the choice of input for the load balancing algorithm might be, and possibly *must* be, different at the two ends of a link aggregation channel. A diagram may be helpful in your explanation.

   Consider example of multiple clients (one end) accessing a server (other end).
   Traffic <u>from the clients</u> all has the same destination, so can only be balanced by using the <u>source</u> address. Traffic <u>from the server</u> all has the same source, so can only be balanced using the <u>destination</u> address.

   Based on the above, we clearly need to use different inputs for link selection at each end

12. [3 marks] Draw **clear** diagrams of an <u>Ethernet II</u> frame with and without a Q-tag. Be sure to correctly label all fields including the payload.

   Without Q-tag [1 mark]:
       [optional: preamble, SFD] dest MAC, src MAC, ether**type**, payload, CRC
   With Q-tag [1 mark = content, 1 mark = order in frame]:
       dest MAC, src MAC, Q-tag {ether**type**, CoS, CFI, VLAN}, ether**type**, payload, CRC

13. [1 mark] In terms of campus network design, **clearly** explain what is meant by "underlined converged network traffic mix"? [Ref: Ch 1, slide 13]

    A single network carry different classes of traffic, such as voice, video, data, and also transactional traffic (eg. db or eCommerce), routing updates, network management

14. [2 marks] During lab work, we saw how configured values for port cost and port priority affected active links in STP. A major learning objective was to determine which switch is affected by each of these two settings. **Clearly** explain a rule for each setting's effect.

    Port costs affect the local switch's choice of root port.
    Port priority affect the downstream switch's choice of root port.

15. [1 mark] A small-sized campus network might combine which two layers in Cisco's "Heirarchical Campus Model"? [Ref: Lab 1 post-lab quiz]

    core and distribution

16. [1 mark] Name the six phases of Cisco's Lifecycle approach to network design (in the correct order).

    PPDIOO: Prepare, Plan, Design, Implement, Operate, Optimize

17. [1 mark] Switches may be configured to be members of VTP domains. What is the maximum number of simultaneous VTP domain memberships that a switch can have?

    1 (one)

18. [1 mark] We have named and defined 5 different VLAN categories or types. Over which of these VLAN(s) do L2 control protocols (DTP, VTP, PAgP, LACP, CDP, etc) always send their frames?

    1 (one); the default VLAN

19. A. [2 marks] **Clearly** define the difference between the VLAN commands "shutdown" and "suspend".

    Shutdown only disables the VLAN on the local switch
    Suspend disables the VLAN globally

    B. [1 mark] For each of these commands, what VTP mode must be configured in order to successfully execute the command? Consider *everything* we have covered in class!

    Suspend: must be in VTP server mode
    Shutdown: can be in VTP server mode, or if done correctly, also from VTP client mode

Extra Work