

INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 2
Semester	Semester 1
Date of Examination	Wednesday 18 January 2012
Time of Examination	9.30am – 11.30am

Prog Code	BN002	Prog Title	Higher Certificate in Science in Computing in Information Technology	Module Code	COMP H2015
Prog Code	BN013	Prog Title	Higher Certificate in Science in Computing in Information Technology	Module Code	COMP H2015
Prog Code	BN104	Prog Title	Higher Certificate in Science in Computing in Information Technology	Module Code	COMP H2015

Module Title	LAN Switching and Wireless
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Internal Examiner(s): *Ms Aoife Fox*
External Examiner(s): *Dr Richard Studdert*

Instructions to candidates:

- 1) To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.
- 2) Attempt **ALL PARTS** of Question 1 and any **THREE** other questions.
- 3) This paper is worth 100 marks. Question 1 is worth 40 marks and all other questions are worth 20 marks each.

Section A: Attempt ALL parts of this question

Question 1: **All parts are worth 4 marks each**

- a)
1. Explain the difference between full duplex and half duplex. (2 marks)
 2. Explain the difference between symmetric and asymmetric switching. (2 marks)
- b) Describe the purpose of Traffic Flow analysis?
- c) Explain each of the following terms:
1. Default VLAN (2 marks)
 2. Management VLAN (2 marks)
- d) List and describe each of the possible VTP modes.
- e) In an Ethernet frame:
- (i) Which field comes immediately after the start frame delimiter and how long is this field? (2 marks)
 - (ii) What is the purpose of the Length/Type field? (2 marks)
- f)
- (i) What factors have slowed the move towards converged networks? (2 marks)
 - (ii) What are the benefits of a converged network? (2 marks)
- g) Outline the functions of the distribution layer of the hierarchical design model?
- h) Wireless access points use CSMA/CA. Outline how CSMA/CA operates.
- i) What is the effect of giving the **vtp pruning** command on a server switch?
- j) Describe in detail the purpose of the Native VLAN.

[Total 40 Marks]

Section B: Answer ANY 3 questions from this section

(All questions carry equal marks)

Question 2:

- a) List and describe the Core and Access layers of the Hierarchical Design Model. (6 marks)
- b) List four benefits associated with hierarchical network design. (4 marks)
- c) Why is redundancy important in a network? (3 marks)
- d) What is a collapsed core model and in what environment is it usually implemented? (4 marks)
- e) How can bandwidth aggregation be implemented? (3 marks)

[Total 20 marks]

Question 3:

(a) Compare and contrast each of the four wireless LAN standards, 802.11a, 802.11b, 802.11g, 802.11n, under the following heading:

- (i) Band
- (ii) Modulation
- (iii) Data Rates

(12 Marks)

(b) A key part of the 802.11 process is discovering a WLAN and subsequently connecting to it. The primary components of this process are **beacons**, **probes**, **authentication** and **association**. Briefly explain each of these components.

(4 Marks)

(c) Briefly describe the three types of Wireless topologies – Basic Service Set (BSS), Extended Service Set (ESS) and Ad Hoc.

(4 Marks)

[Total 20 marks]

Question 4:

Introduction:

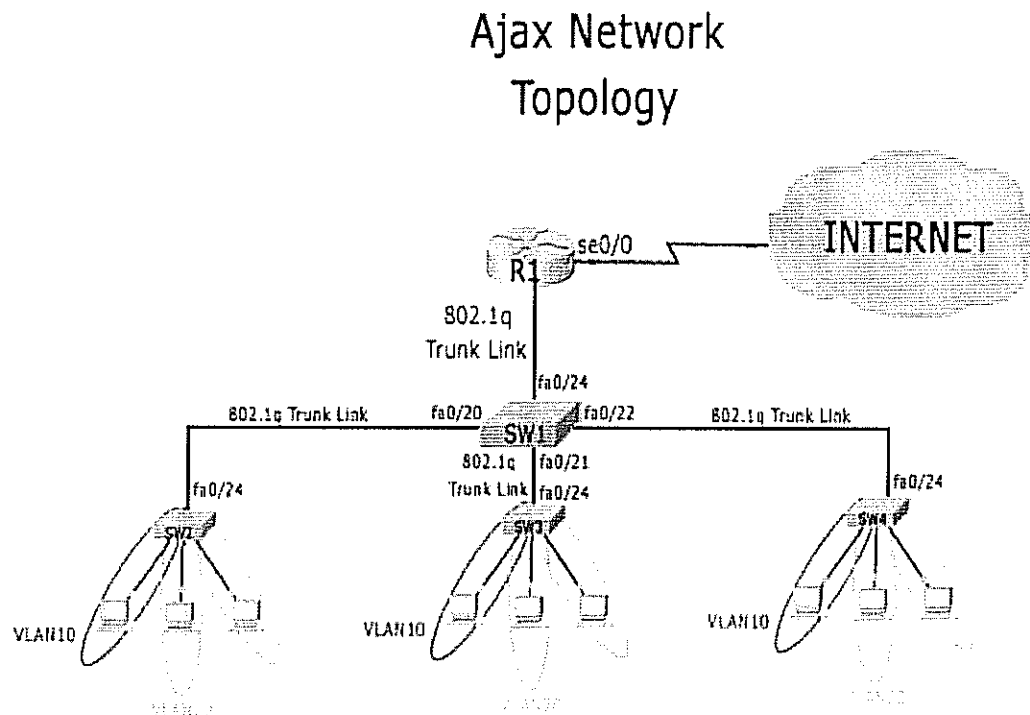
Ajax Enterprise acquired more switches and wants to connect them to their network. They called you to accomplish the task.

The Scenario:

Ajax increased the number of computers on their network and decided to optimize it. After a study of Ajax network (designed by you in the past), you decided to implement the topology shown below.

The topology uses 3 different VLANs to separate traffic: VLAN10, VLAN20 and VLAN30. The router R1 will route between them. A VTP domain will be created to manage the VLANs.

Topology:



Based on the above scenario, answer the questions below:

- a) What are the two methods of assigning an end device to a VLAN, and which method is more common? (Assume that voice traffic is not required.)

(4 marks)

- b) Why is it necessary to configure the switches as VTP clients before connecting them to the network?

(2 marks)

- c) The VTP name AJAX was configured with capital letters in all 3 switches. Is this necessary? Explain why/why not?

(2 marks)

- d) Once the switches are configured, you connect the cables. VTP domains require a trunk link between the switches. List the commands you would use to configure the trunk links between all switches (**SW1** to **SW4**).

(8 marks)

- e) Once all trunk links are up and running, you issue a show vlan command in SW2, SW3 and SW4 and notice that all VLANs created in SW1 were learnt by the new switches via VTP domain.

As the administrator of AJAX enterprise, how would you troubleshoot if a trunk link is not working correctly? What should you check?

(4 marks)

[Total 20 marks]

Question 5:

- a) The STP algorithm uses three steps to converge on a Loop-Free topology by electing a root bridge, **root port**, a **designated port** and a **non-designated port**. Describe each terminology in bold.

(3 marks)

- b) STP uses the Spanning Tree Algorithm to determine which switch ports on a network need to be configured for blocking to prevent loops. Through an election process, the algorithm designates a single switch as the root bridge. Describe the election process of the root bridge.

(4 marks)

- c) How does the Spanning Tree Algorithm determine the "best path"?

(3 marks)

- d) List and describe the five STP port states.

(5 marks)

- e) Given the network topology shown below, show the root bridge and final state of each switch port after the implementation of the spanning tree algorithm. (Assume equal path costs for all paths)

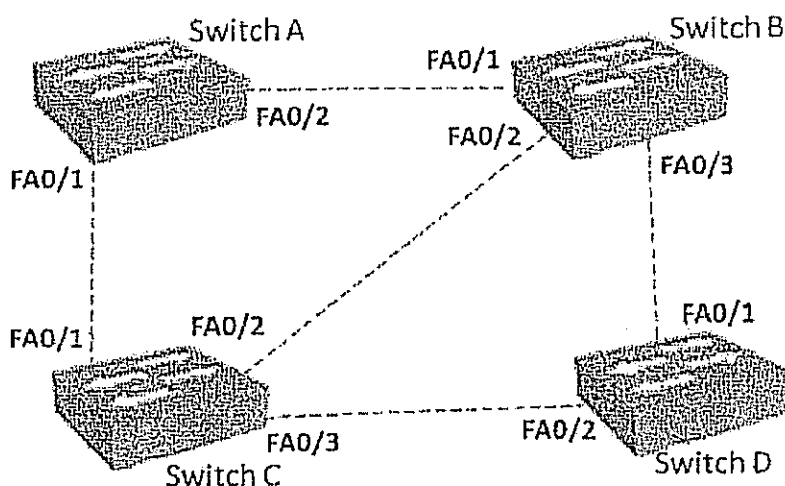
(5 marks)

Switch A	
Priority:	32769
MAC:	000A00222222

Switch B	
Priority:	32769
MAC:	000A00333333

Switch C	
Priority:	24577
MAC:	000A00444444

Switch D	
Priority:	24577
MAC:	000A00333333



[Total 20 marks]