

# INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

<b>Year</b>	Year 2
<b>Semester</b>	Semester 1
<b>Date of Examination</b>	Tuesday 18 January 2011
<b>Time of Examination</b>	9.30am – 11.30am

<b>Prog Code</b>	BN002	<b>Prog Title</b>	Higher Certificate in Computing in Information Technology	<b>Module Code</b>	COMP H2015
<b>Prog Code</b>	BN013	<b>Prog Title</b>	Bachelor of Science in Computing in Information Technology	<b>Module Code</b>	COMP H2015
<b>Prog Code</b>	BN104	<b>Prog Title</b>	Bachelor of Science (Honours) in Computing	<b>Module Code</b>	COMP H2015

<b>Module Title</b>	Switching Basics and Intermediate Routing
---------------------	---

**Internal Examiner(s):** *Mr Mark Cummins*  
**External Examiner(s):** *Dr Richard Studdert, Mr John Dunnion*

---

## 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.

**DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO**

**Section A:** Attempt ALL parts of this question

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

- a)
1. With respect to network design, what is convergence? (2 marks)
  2. List any two potential benefits of a converged network. (2 marks)
- b) What is the purpose of performing data stores and data server analysis?
- c) Describe each of the following key features associated with switches used in hierarchical networks.
1. Switch form factor
  2. Fixed configuration switches
  3. Modular switches
  4. Stackable switches
- d) List and briefly describe any 4 benefits of implementing VLANs.
- e) What is the purpose of VTP pruning?
- f) Outline how someone might perform a denial-of-service attack on a wireless access point.
- g) How does an Ethernet switch process the incoming traffic using port-based memory buffering?
- h) Briefly describe each of the three main WLAN security protocols.
- i) List the five STP port states.
- j) An Ethernet switch has built the MAC address table shown. What action will the switch take when it receives the frame shown at the bottom of the exhibit?

**MAC address table**

Station	Interface 1	Interface 2	Interface 3	Interface 4
00-00-3d-1f-11-01	X			
00-00-3d-1f-11-02		X		
00-00-3d-1f-11-03			X	

**Frame**

Destination	Source
00-00-3d-1f-11-05	00-00-3d-1f-11-01

**Section B: Answer ANY 3 questions from this section**

(All questions carry equal marks)

**Question 2:**

- a) List and briefly describe 4 of the benefits associated with hierarchical network design. (8 marks)
- b) Explain your understanding of the term 'Network Diameter'. (2 marks)
- c) What is the purpose of performing regular traffic flow analysis? (4 marks)
- d) What is a collapsed core model and in what environment is it usually implemented? (4 marks)
- e) What would be the port capacity of a single port on a 48-port Gigabit Ethernet switch? (1 mark)
- f) A switch that uses MAC addresses to forward frames operates at which layer of the OSI model? (1 mark)

**(Total 20 marks)**

### Question 3:

- a) Highlight the advantages and disadvantages and explain the role played by a switch in relation to both collision domains and broadcast domains on a network.

**(8 marks)**

- b) A port on a switch needs to be configured with duplex settings that match the media type. The Cisco catalyst switches have three settings: auto, full and half. Briefly explain each of these switch port settings.

**(3 marks)**

- c) A junior network technician has set all the switch port duplex settings to auto; she then attaches a number of devices. All the devices appear to be connecting and operating correctly, except for a single scanner. The technician is puzzled by the problem as there is another similar scanner connected and operating correctly. On investigating the setting for both scanners she notices that the only difference appears to be that one of the scanners is set to full duplex, while the other is set to half duplex.

1. Explain what you think is the likely cause of this problem.

**(4 marks)**

2. Which of the two scanners is working correctly and why is the second scanner not working correctly?

**(2 marks)**

- d) A network technician at a client's site needs to connect two switches together; unfortunately he only has a single straight through cable and doesn't have the crossover cable required.

1. What feature on the switch could the technician enable to help him solve this problem?

**(2 marks)**

2. Does the technician have to enable this feature on both switches or just one of the switches, briefly explain your answer.

**(1 mark)**

**(Total 20 marks)**

#### Question 4:

- a) List any three benefits of using the VLAN Trunking Protocol. **(3 marks)**
- b) A switch can be configured in one of three VTP modes, list and describe each of the available VTP modes. **(6 marks)**
- c) Describe each of the different VTP advertisement types. **(6 marks)**
- d) A student in the lab is trying to setup VTP between two switches. he first creates some VLANs and then names them on the first switch, he then sets the VTP domain name on the same switch. When he goes to check if VTP is working correctly he issues the 'show vtp status' command on both switches and the output is shown below.

Based on the output from both switches, explain why you think the student has or hasn't set up VTP correctly. (Make reference to the various output fields to justify your decision) **(5 marks)**

S1# show vtp status	S2# show vtp status
VTP version :2	VTP version :2
Configuration revision :0	Configuration revision :0
VTP Operating mode :Server	VTP Operating mode :Server
VTP Domain name :ITB	VTP Domain name :ITB

**(Total 20 marks)**

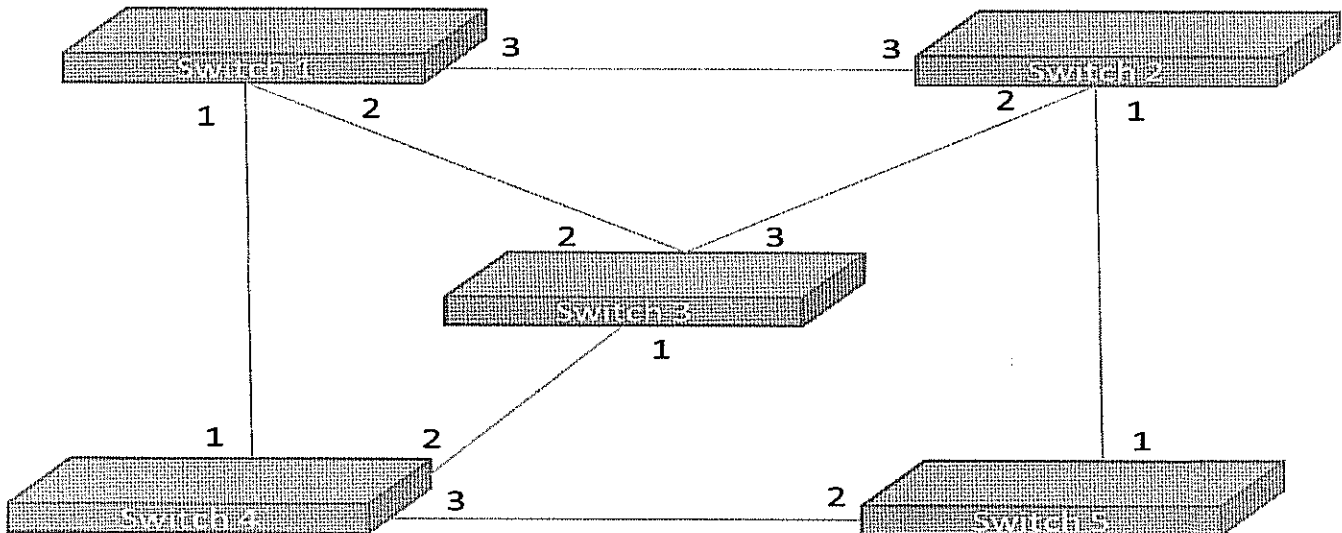
## Question 5:

a)

- i. Redundancy is an important part of hierarchical design. Although it is important for availability, it can cause some serious problems in a fully switched topology. Describe the possible problems caused by introducing redundancy into a switched network. **(9 marks)**
- ii. How are these problems solved by IP packets? **(2 marks)**
- iii. How are these problems solved by Ethernet frames? **(2 marks)**

- b) 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) **(7 marks)**

Switch 1	Bridge ID: 32769.000A00333333
Switch 2	Bridge ID: 32769.000B00444444
Switch 3	Bridge ID: 12417.000C00555555
Switch 4	Bridge ID: 10226.000A00666666
Switch 5	Bridge ID: 12417.000C00777777



**(Total 20 marks)**