INSTITUTE OF TECHNOLOGY

BLANCHARDSTOWN

Year	Year 3
Semester	Semester 1 Repeat
Date of Examination	
Time of Examination	

Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3021
Prog Code	BN302	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3021
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H3021

Module Title	Advanced Switching and Routing

Internal Examiner(s): **Michael O'Donnell**
External Examiner(s): **Dr. Richard Studdert,**
Mr. John Dunnion

Instructions to candidates:

1) **Attempt <u>ALL PARTS</u> of Question 1 and any <u>TWO</u> other questions**
2) **Question 1 is worth 40 marks and all other questions are worth 30 marks each.**

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Question 1 (Mandatory)

(a) Outline, with the aid of a diagram, the main components of a large campus network, using the hierarchical design model.

(8 marks)

(b) Give an overview of the Cisco Express Forwarding (CEF) technology as used in Multilayer switches.

(8 marks)

(c) Outline the situations where it is appropriate to use the Border Gateway Protocol (BGP) between autonomous systems.

(8 marks)

(d) Explain the following parameters used by the Spanning Tree Protocol (STP) algorithm: *Bridge ID, Path Cost* and *Port ID*.

(8 marks)

(e) State the justification of replacing end-to-end VLANs with local VLANs and outline the main usage guidelines that should be followed in the operation of local VLANs.

(8 marks)

Question 2

(a) List the **seven** different states an OSPF interface on a router will go through before achieving full-adjacency status.

(7 marks)

(b) Describe the **five** steps in OSPF operation and explain the role of the DR and BDR routers.

(14 marks)

(c) Describe the operation of each of the following area types in an OSPF Multi-Area network: **Backbone Area, Stub Area, and Totally Stubby Area**. Illustrate your answer with a diagram.

(9 marks)

Question 3

(a) Outline the situations where it is **not** recommended to use BGP within an Autonomous System.

(6 marks)

(b) Outline the **twelve-step** process by which BGP uses attribute values in choosing the best route when faced with multiple routes to the same destination. You may use a flow chart instead to illustrate your answer.

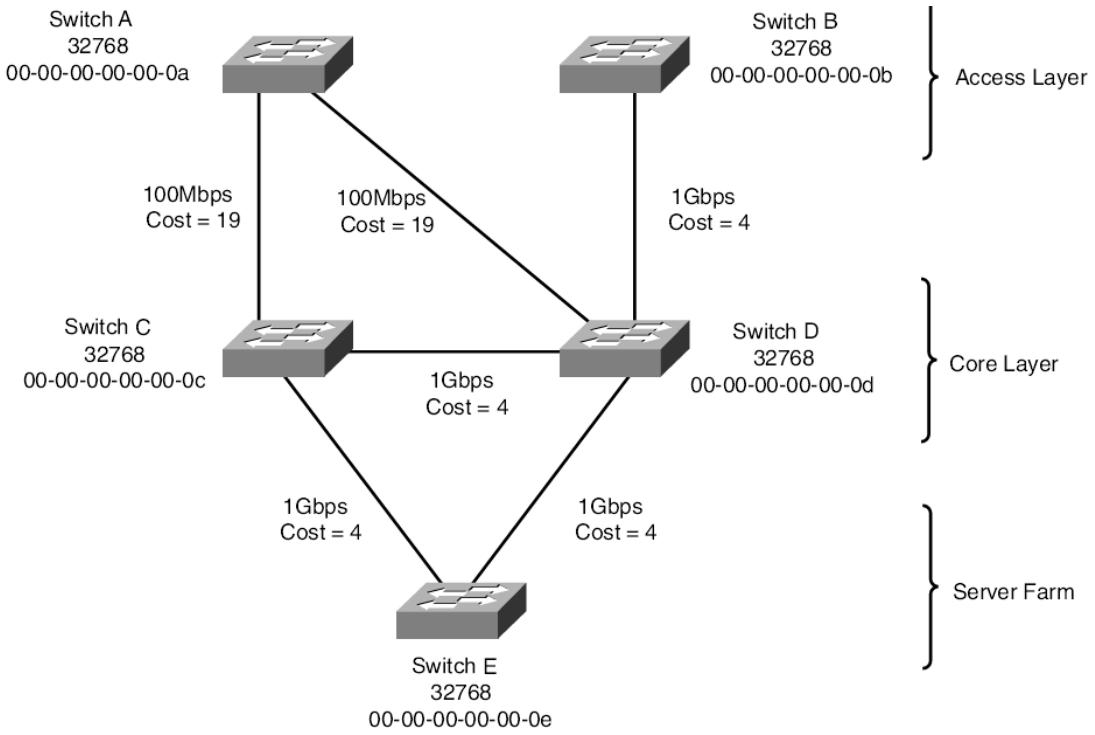
(24 marks)

Question 4

(a) Outline the justification of using the Spanning-Tree Protocol (STP).

(6 marks)

(b) The diagram below shows a typical hierarchical campus network. The Bridge IDs for each switch and the link costs are shown.



Label the Root Bridge and the correct designation of each port, i.e. if it is a Root, Designated or Blocking port.

(12 marks)

(c) STP uses an initial **three** step process in achieving convergence: *elect a Root Bridge*, *elect Root Ports* and *elect Designated Ports*. Describe in detail each of these steps.

(12 marks)