FACULTY OF BUSINESS
AND INFORMATION TECHNOLOGY
PORIRUA CAMPUS

Bachelor of Information Technology
Diploma in Information Technology
Level 6
Graduate Diploma in Information Technology

Networking Technologies (IT6x87)
Semester 1 – 2015

Final Exam
Course Weighting 40%

Time Allowed: 120 minutes (2 Hours)
+ 10 minutes reading time

Section	Description	Questions	Section Marks
A	Short Answers	1 to 7	42
B	Cisco Questions	9 to 18	38
C	SDN Questions	19 to 22	20
		Total marks	**100**

Examination Notes

- The time allowed for this examination is **2 hours** (120 minutes) + 10 minutes reading time.
- You may not begin to write until you are notified that the **10 minute reading time** is over.
- Answers to exam questions are to be written in the **exam answer book**.
- This is a **CLOSED BOOK** examination. All closed book exam rules apply.
- This exam is worth 40% of the total course weighting.
- To pass the IT6x87 course, the requirements are:
  - A minimum percentage grade of 40% in this examination

  AND
  - A minimum overall weighted course percentage grade of 50%.

Section A: Short Answers (42 marks)

Answer all questions from this section. **Each question in this section is worth 6 marks.**

1. You have studied the current practise of LAN design using a hierarchy, and borderless switched network. Four principals of this design are
   - Hierarchical
   - Modularity
   - Resiliency
   - Flexibility

   Briefly state how each of these principals contributes to improving network performance.

2. Three types of common security attacks are
   - MAC address flooding,
   - DHCP spoofing
   - Taking advantage of ('leveraging') CDP.

   Briefly describe how each of these attacks can threaten a LAN.

3. State why it is important to use Network Time Protocol (NTP) on all critical network devices. NTP is a client/server based protocol. Describe how the client and server work together. List two (2) sources of correct time.

4. What is the key table required for a device to manage routing? Describe three (3) ways entries can be added to that table.

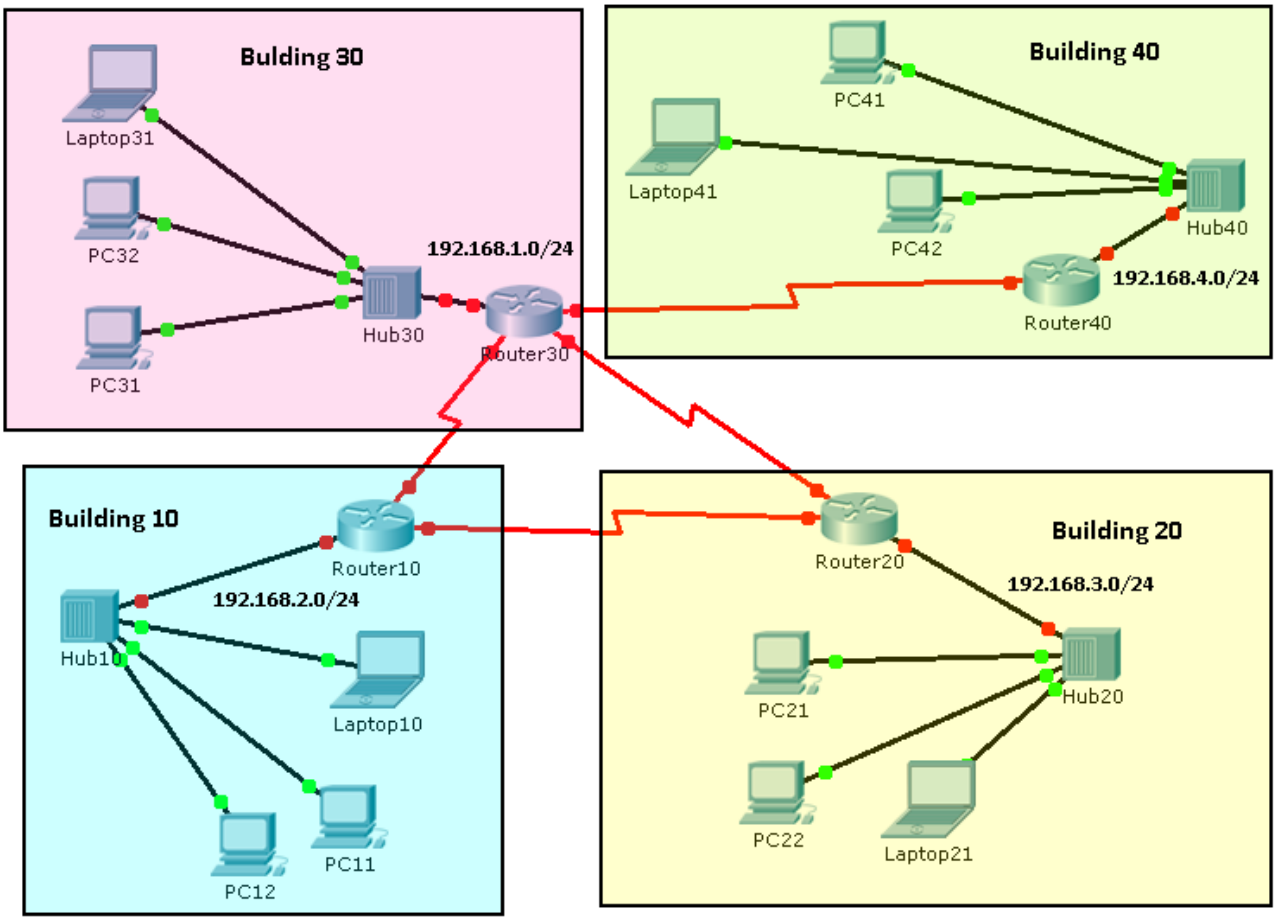
5. An Access Control List (ACL) is a series of commands that control whether a router forwards or drops packets based on information from the packet header. Describe three (3) uses for ACLs.

6. Consider the concept and operation of Port Address Translation (PAT or 'NAT Overload') in a situation where two host computers are communicating with two servers on the Internet at the same time, using one public IP address. Describe, using a diagram if necessary, the changes to IP address and port numbers during these two 'conversations'.

7. Software Defined Networking (SDN) is based on open standards. Describe two (2) advantages and two (2) disadvantages of using open standards.

Section B: Long Answers (38 marks)

Consider Exhibit A. – Example of small network using Routers and Hubs (21 marks)



9. List the collision domains in this network. (2 marks)

10. Describe the broadcast domains in this network (2 marks)

For the rest of the Exhibit A questions, assume all the hubs have been replaced with switches.

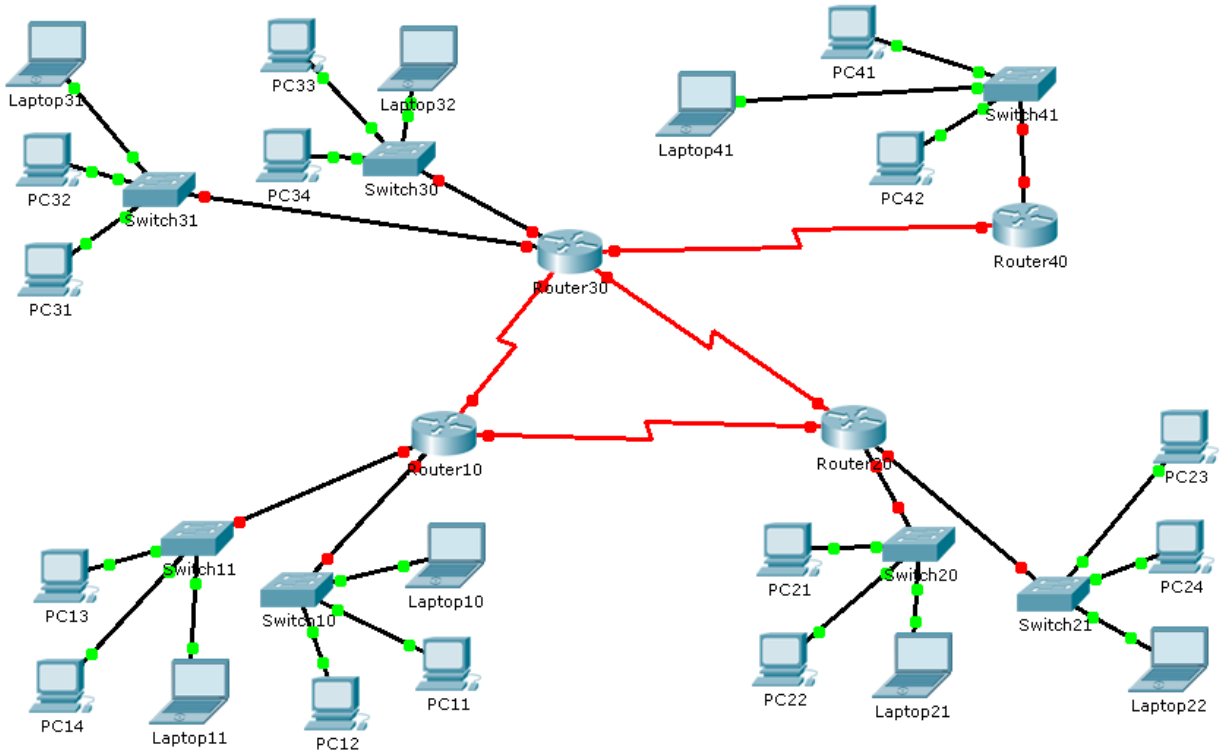
11. How does this change your answers to questions 9 and 10? (2 marks)

12. Describe four advantages of a switched network when compared to a 1990's era hub-based network. (4 marks)

13. There are four laptops shown in exhibit A. These are used by sales staff. Describe how the network could be configured so the laptop users can be on the same logical network. Your description should include at least three clear configuration steps. Describe principles, not specific commands. (6 marks)

14. State a summary route that could be used on router 40 to provide a route to the other three networks. Explain your choice. (5 marks)

Consider Exhibit B. – This is the network from Exhibit A, expanded with addition of more switches and hosts. The network is now using OSPF routing protocol. (17 marks)



15. Now that the network is significantly bigger, computers are being moved around more, and more networks are being added. Describe three features of OSPF that make it suitable for this environment. (3 marks)

16. The network is still spread around four buildings, and the serial links between buildings are a little slow. Describe the feature of OSPF that can be used to deal efficiently with this situation, briefly outlining how it would apply to the example of Exhibit B. (5 marks)

17. The types of packet used by OSPF are typically referred to by these abbreviations:
    - Hello
    - DBD
    - LSR
    - LSU
    - LSAck

    For three of these, name the packet type, and briefly describe the purpose of that packet type (6 marks)

18. In this course we have considered three Interior Gateway Protocols in detail, divided into two broad types. List the three protocols, stating which type of dynamic router protocol each is. (3 marks)

Software Defined Networking (SDN) questions (20 marks)

19. Key aspects of SDN can be broken down to three parts. Name those three parts of an SDN infrastructure. (3 marks)

20. Refer to Exhibit B above. Briefly summarise what would be required to change that network to run using SDN. (6 marks)

21. "Software Defined Networking (SDN) separates control and data planes"
    Explain this statement, with reference to the function of each plane, including at least three advantages SDN offers over conventional networking. (5 marks)

22. In an SDN environment, 'flows' can be sent to a physical device that carries data packets on the network. Briefly define six different parameters that can be included in a flow. (6 marks)

***** END OF EXAM *****