Cork Institute of Technology

Bachelor of Science in Computing in
Information Technology Support – Award

(KITSU_7_Y3)

Summer 2008

Computer Networks

(Time: 3 Hours)

Answer any **FOUR** questions
All questions carry equal marks

Examiners: Mr. T. Horgan
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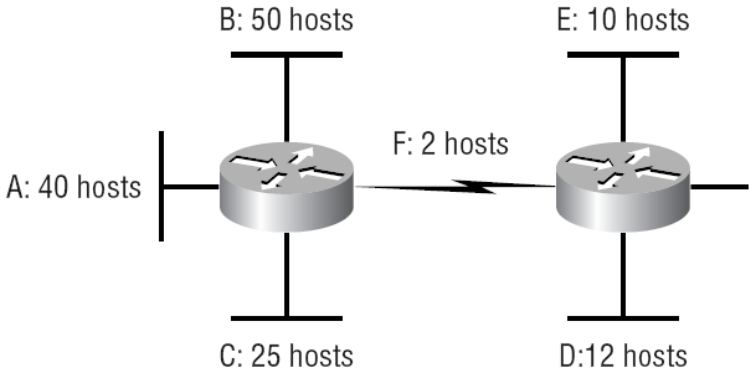
Question 1 – Advanced IP

a) An organisation wishes to use network address 192.168.1.0/24 to create the following network configuration. Create an efficient subnet arrangement for this company. Give reasons for each address block allocation. (15)



b) Calculate the summarised route for networks 151.100.1.0/24 through to 151.100.15.0/24. Your answer should show the binary representation of the summarised addresses. (5)

c) A network administrator wishes to permit access to the Internet for only hosts that are assigned an address in the range 192.168.8.0 through 192.168.15.255? What ACL wild card mask is needed? Explain your answer. (5)

Question 2 – Network Applications

a) Explain the naming hierarchy used in the DNS. Describe, using an example, how the nameservers implement this hierarchy in resolving a query for www.cit.ie from a workstation in the U.S. (pc1.mit.edu). (15)

b) List the **five** types of DNS resource records and describe each type. (5)

c) Write a note about IMAP (Internet Message Access Protocol IMAP). Explain how this protocol differs from POP3 (Post Office Protocol). Describe the disadvantage of using POP3. (5)

Question 3 – OSPF

a) OSPF interfaces can be in one of the following states: (1) Down State, (2) Init State, (3) Two-Way State, (4) ExStart State, (5) Exchange State, (6) Loading State,(7) Full Adjacency. Describe OSPF neighbour relationships as routers progress through these states, one at a time. (15)

b) Describe in detail the function of a designated router and a backup designated router in a broadcast multiaccess network. (5)

c) The rules that govern the exchange of OSPF Hello packets are collectively referred to as the Hello protocol. Describe how this protocol operates. (5)

Question 4 – Security

a) Security administrators have to deal with many threats against their networks. Discuss. (15)

b) Experienced crackers use various reconnaissance techniques before mounting a network attack. Describe these techniques and suggest ways of stopping these attacks. (5)

c) Describe how a TCP SYN attack works. (5)

Question 5 – Frame Relay

a) Write a brief definition for the following terms:
(i) Local Management Interface, (ii) Data Link Connection Identifier,
(iii)Local Access Rate, (iv) Committed Information Rate (8)

b) There are three virtual circuit design strategies for a Frame Relay cloud.
Explain what these are and the advantages and disadvantages associated with each. (7)

c) When connecting a router to a Frame Relay network with multiple destinations, split-horizon issues can occur. Explain why this is and the two methods you could use to fix these issues. (5)

d) When you connect a router to a Frame Relay network, the service provider transmits DLCI information to your router via LMI. How does the router then find the Layer 3 address to associate with the circuit? (5)

Question 6 – PPP

a) PPP has the capability to use two different compression algorithms.
What are they? What is the effect of these algorithms on your router?
Why would you choose to use one algorithm over the other? (8)

b) How does Challenge Handshake Authentication Protocol (CHAP) work?
How does CHAP differ from Password Authentication Protocol (PAP)? (8)

c) Describe each of the **five** states of a PPP connection. (5)

d) What **four** features are negotiated by PPP's LCP? (4)