CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 2 Examinations 2012/13

Module Title: WAN Technologies

Module Code: COMP7022

School: Science & Informatics

Programme Titles: BSc (Hons) in Software Development & Computer Networking
BSc in Computing
Higher Certificate in Computing
BSc in Information Technology Support
BSc (Hons) in Information Technology Management

Programme Codes: KDNET_8_Y2
KCOMP_7_Y2
KCOME_6_Y2
KITSE_7_Y3
KITMN_8_Y2
KITSU_7_Y3

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Internal Examiner(s):   O. Brickley
P. McCarthy

Instructions: **Answer question one and any two other questions**

Duration: 2 hours

Sitting: Summer 2013

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you are attempting the correct examination.
If in doubt please contact an Invigilator.

Q.1 Compulsory Question

a) A network manager is building a WAN and must choose an appropriate WAN access technology. What criteria should the network manager use to compare the different options?   4 Marks

b) What are the differences between a circuit-switched network and a packet-switched network?   4 Marks

c) What are the components of PPP?   3 Marks

d) Frame Relay provides a facility to carry multiple Virtual Circuits (VCs) over a single physical line. How is each VC identified, and how does this sharing save money?   4 Marks

e) What is meant by the terms Worm, Virus, Trojan Horse?   6 Marks

f) Give examples of configuration vulnerabilities that may be present in a network.   3 Marks

g) How many ACLs can be configured and/or applied on a router?   4 Marks

h) On what criteria can an ACL make its permit or deny decision?   4 Marks

i) What methods are used for connecting teleworkers to a WAN?   4 Marks

j) What are the drawbacks of using NAT?   4 Marks

Q.2 Point-to-Point Protocol (PPP), Frame Relay

a) What are the differences between Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP)? (6 Marks)

b) Why is a full mesh implemented with Frame Relay better than one implemented with leased-lines? (6 Marks)

c) Given the following topology and configuration extracts, identify the reason(s) why the two routers cannot ping each other. (6 Marks)


```
hostname R1                                    hostname R3
username R1 password sum1                       username R1 password somebody
!                                               !
int serial 0/0                                  int serial 0/0
ip address 128.0.1.2 255.255.255.255            ip address 128.0.1.2 255.255.255.255
encapsulation hdlc                              encapsulation ppp
ppp authentication pap                          ppp authentication chap
ppp pap sent-username R1 password sum1          ppp pap sent-username R3 password sum1
```

d) Why are sub-interfaces used in Frame Relay WANs? (6 Marks)

e) What configuration tasks are required on the routers in the topology below to configure them for basic Frame Relay connectivity? (6 Marks)

Q.3   Network Security, Access Control Lists

a) Briefly outline the techniques hackers use for reconnaissance attacks on a network.

8 Marks

b) What is a security policy?

4 Marks

c) A network administrator wants to block traffic from a range of external IP addresses from entering the company network. What type of access-list is appropriate and where should it be placed? Give reasons for your answer.

6 Marks

d) An attacker has been able to connect directly into a link between two routers and inject false routing information to cause packets to be sent to the hacker's machine. How could the routers have been configured to guard against this situation?
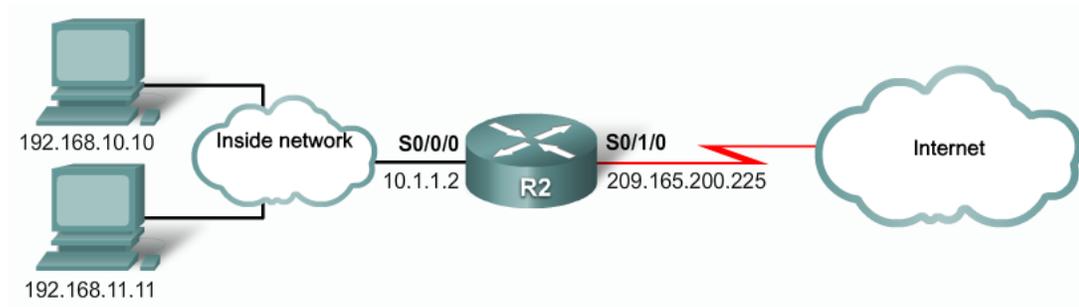
6 Marks

e) Give an account of time-based ACLs.

6 Marks

Q.4   Teleworker Services, Implementing IP Addressing Services, Network Troubleshooting

a)   In a VPN, how does a symmetric encryption algorithm work?   10 Marks

b)   In the network shown below, PC2 has obtained an IP address from the DHCP server, but PC1 is unable to. What is the likely cause of the problem, and how could it be resolved?

5 Marks
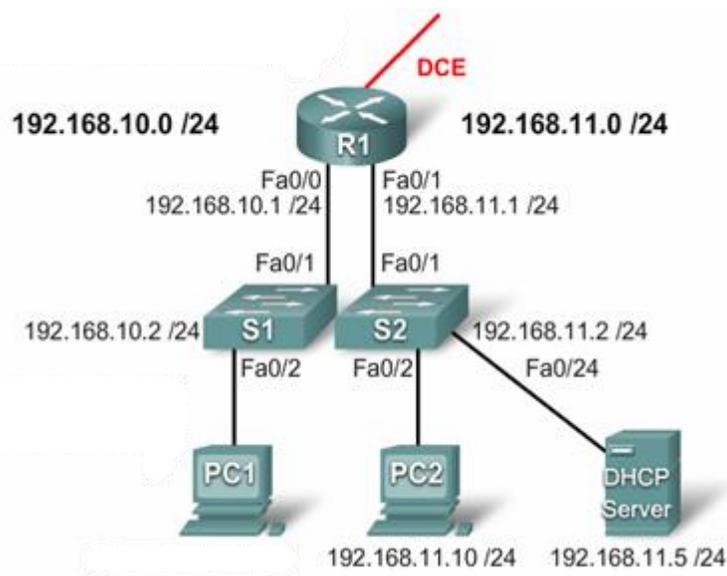
c) In the context of IPv6, give an account of 'Tunnelling'.   5 Marks

d) In the topology shown, R2 has been given the NAT configuration extracted below. Explain the purpose of each numbered line of the configuration.

10 Marks

```
            interface Serial0/0/0
            ip address 10.1.1.2 255.255.255.0
    1       ip nat inside
            !
            interface Serial0/0/1
            ip address 209.165.200.225 255.255.255.224
    2       ip nat outside
            !
    3       ip nat pool NAT-POOL1 209.165.200.226 209.165.200.240 netmask
    255.255.255.224
    4       ip nat inside source list 1 pool NAT-POOL1
            !
    5       access-list 1 permit 192.168.0.0 0.0.255.255
```