

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Semester 2 Examinations 2010/11

Module Title: WAN Technologies

Module Code: COMP 7022

School: Computing

Programme Titles:

Bachelor of Science (Honours) in Software Development and Computer Networking – Year 2

Bachelor of Science in Computing – Year 2

Higher Certificate in Science in Computing – Year 2

Bachelor of Science in Information Technology Support – Year 3

Higher Certificate in Science in Computing in Information Technology Support – Year 3

Bachelor of Science (Honours) in IT Management – Year 2

**Programme Codes: KDNET_8_Y2
 KCOMP_7_Y2
 KCOME_6_Y2
 KITSU_7_Y3
 KITSE_7_Y3
 KITMN_8_Y2**

External Examiner(s): Dr. Kevin Curran

Internal Examiner(s): Mr Jonathan Sherwin, Ms Aisling O’Driscoll

Instructions: Answer question one and any two other questions

Duration: 2 Hours

Sitting: Summer 2011

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.

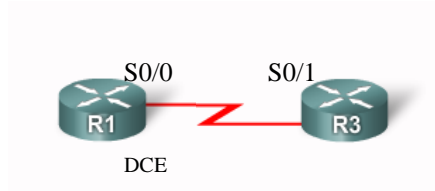
If in doubt please contact an Invigilator.

Q.1 Compulsory Question

- a) Define the terms 'Demarcation Point', 'Local Loop', 'Central Office' as used by telecoms providers? 4 Marks
- b) What data-link layer protocols are typically used in WANs? 4 Marks
- c) Give a brief account of Time Division Multiplexing (TDM). 4 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) In the context of network security, what are structured and unstructured threats? 4 Marks
- f) What is an Access Control List (ACL), and how does it work? 4 Marks
- g) Describe what happens during a SYN flood attack. 4 Marks
- h) What methods are used for connecting teleworkers to a WAN? 4 Marks
- i) What items of documentation are most important when troubleshooting a network? 4 Marks
- j) What steps should be followed in any troubleshooting procedure? 4 Marks

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

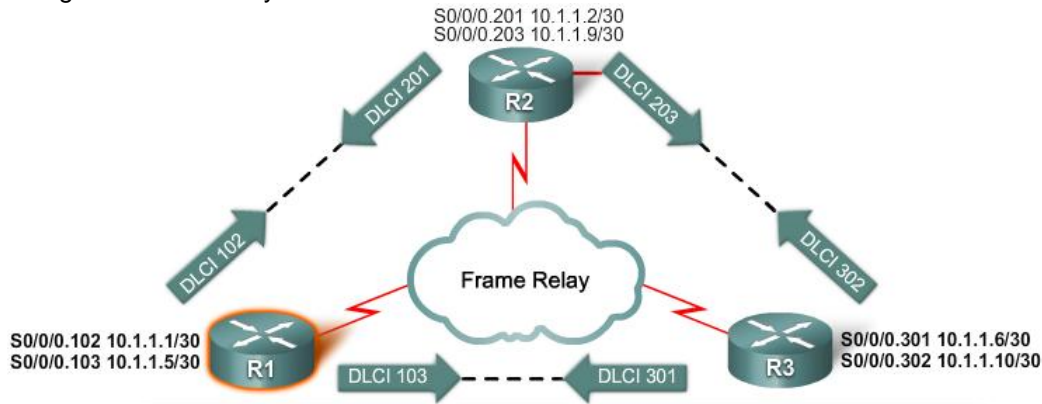
- a) In the context of PPP, give a brief account of Link Control Protocol (LCP). 6 Marks
- b) What are the differences between Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP)? 6 Marks
- c) Given the following topology and configuration extracts, identify the mistakes in the configurations.



6 Marks

<pre>hostname R1 username Router3 password letmein ! int serial 0/0 ip address 128.0.1.1 255.255.255.255 encapsulation ppp ppp authentication pap ppp pap sent-username R1 password letmein</pre>	<pre>hostname R3 username Router1 password letmine ! int serial 0/0 ip address 128.0.1.2 255.255.255.0 encapsulation ppp ppp authentication chap</pre>
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- d) What is the purpose of a Frame Relay mapping table? How is it populated? 6 Marks
- e) A network has been built following the topology below, and is being tested. R2 and R3 can ping each other, but R1 cannot communicate with any other device. R1 was configured by an inexperienced technician, and part of the sequence of configuration commands he used is shown. Explain the mistake(s) he made. How should he have configured R1 correctly?



6 Marks

```
hostname R1
!
interface serial 0/0
ip address 10.1.1.1 255.255.255.252
ip address 10.1.1.5 255.255.255.252
encapsulation frame-relay
no shutdown
exit
```

Q.3 Network Security, Access Control Lists

- a) Give a brief account of Denial of Service (DoS) attacks. 6 Marks
- b) Following complaints from users, a network administrator has discovered a dramatic increase in traffic to the company web server. Use of a packet sniffer has revealed that 97% of the traffic is ICMP Echo Request packets coming from many different source IP addresses. What is happening, and how should the network administrator respond? 6 Marks
- c) 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
- d) Write the IOS commands to define an Access Control List (ACL) that will meet the following requirements: 6 Marks
- a. explicitly deny all traffic other than what's listed below.
 - b. permit traffic from hosts with even addresses on the 192.168.1.0/24 network.
 - c. deny FTP traffic from any host (including all those on the network above).
 - d. permit Telnet traffic from any host.
- e) 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

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

- a) What types of security are provided by a VPN? 6 Marks
- b) A network administrator has configured a router to act as a DHCP server. A test PC has obtained an IP address, can ping IP addresses on the local network and on remote networks, but Internet browsing does not work. Following is an extract showing the DHCP configuration. What is cause of the problem, and how can it be solved? 6 Marks
- ```
! Don't allocate the router's IP address or the IP address of the DNS server to any host
ip dhcp excluded-address 192.168.10.1 192.168.10.9
!
ip dhcp pool LAN-POOL-1
network 192.168.10.0 255.255.255.0
default-router 192.168.10.1
!
```
- c) Give a brief outline of NAT Overloading. 6 Marks
- d) Outline the common causes of physical layer problems. 6 Marks
- e) In the context of IPv6, give an account of 'Dual Stacking'. 6 Marks