

UNIVERSITY OF MALTA  
BOARD OF STUDIES FOR INFORMATION TECHNOLOGY/  
FACULTY OF SCIENCE

Department of Computer Science & A.I.

B.Sc. I.T.(Hons.)/B.Sc.(Hons.) Year II

June 2006 Assessment/Examination Session

CSA2100: Techniques in Operating systems      17th June, 2006

9:15-11:45

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*Read **ALL** questions before starting. Choose **two** questions out of the three provided. Each question carries 25 marks of the total grade.*

**Section A**

A

## Section B

4. (a) Give a scenario where the standard RIP protocol could lead to a very long convergence time.  
[7 marks]
- (b) Give possible solutions to the problem mentioned in (a).  
[7 marks]
- (c) Explain the window principle in TCP. Give possible advantages that the window principle gives you over a strict acknowledgment protocol.  
[6 marks]
- (d) Explain the Nagle Algorithm and the advantages it provides when implemented in TCP.  
[5 marks]
5. (a) Explain how TCP guarantees that a receiver never ends up with full buffers resulting in loss of packets.  
[5 marks]
- (b) Explain the two main techniques used with TCP that guarantee that flow of data is also sensitive to available network bandwidth.  
[5 marks]
- (c) Explain why in a TCP stack that implements *Fast Retransmit*, one should also implement *Fast Recovery*.  
[5 marks]
- (d) Describe why a three-way handshake is used for connection initiation in TCP while a four-way handshake is used when a connection is terminated. In addition, describe how the four-way handshake can actually be implemented using on average three packets instead of four.  
[10 marks]
6. (a) Using the OSI Model for your explanations, explain in which layers the Ethernet protocol, ARP and DNS reside.  
[6 marks]

(b) A networked computer has just been switched on. Give a list of the packets sent and received (including destination and source details and a description of their contents) from power up until the web page *www.cnn.com* is displayed in a web browser. The computer at startup is just configured to use DHCP.

[9 marks]

(c) Explain why NAT is not a viable solution to secure a number of web servers in a network.

[5 marks]

(d) Certain applications cannot be used behind an application level gateway. Explain why and give two solutions to this problem while minimising security risks.

[5 marks]

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