

UNIVERSITY OF SWAZILAND

Faculty of Science

Department of Computer Science

SUPPLEMENTARY EXAMINATION 2008

Title of paper: NETWORKS AND CODING THEORY – II

Course number: CS438

Time allowed: 3 hours

Instructions: *Answer any 5 of the 6 questions.*

**THIS EXAMINATION PAPER SHOULD NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY
THE INVIGILATOR**

Question 1

- a) Describe the services provided by the network layer. [4]
- b) Define and contrast between, connection oriented and connectionless routing in packet switched networks. [8]
- c) State and briefly explain any 2 properties of a good routing algorithm. [4]
- d) Describe the flooding method of routing and explain when its use is appropriate. [4]

Question 2

- a) When does congestion occur? Explain the problems encountered if in a network there is no traffic control? State any 2 goals of traffic control. [10]
- b) Distinguish between repeaters, bridges, routers and gateways. [5]
- c) In routing hardware, which one can be done at the faster rate: processing or data transfer? How does this observation influence the design of routing strategies? [5]

Question 3

- a) Describe the five primitive services offered by the transport layer. [5]
- b) Describe how connections may be established by three way handshake. In addition, explain why a two way handshake would be inadequate. [5]
- c) Distinguish between TCP and UDP, explaining the kinds of application to which each is suited. [10]

Question 4

- a) How does TCP ensure reliable delivery of packets? How does it also ensure ordered delivery of packets? [8]
- b) More and more individuals, organizations, institutions and businesses are turning to the Internet as an integral resource for information because of the widespread use and acceptance of the technology, and because of the ease of use and relatively low cost. List and explain any 4 benefits that an organisation like UNISWA can derive from the Internet? [4]
- c) What is DHCP? What does it do? [4]
- d) What does "security through obscurity" mean? Is it a good or a bad idea? Why? [4]

Question 5

- a) List any two HTTP methods and any 2 status codes. [4]
- b) Briefly explain how the following cryptosystems work:
 - i) One time pad
 - ii) Tripple DES [4]
- c) With the aid of appropriate examples explain how transposition and substitution ciphers work. [6]
- d) How do public key cryptosystems differ from conventional systems? [6]

Question 6

- a) What is currently the most widely used internetwork? What is the network layer protocol chosen for this internetwork? What is the role of a gateway in internetworks? [7]
- b) Compare and contrast the client- server architecture with the peer-to- peer (P2P) architecture. [4]
- c) Briefly state the meaning of any three of the following Internet based terms in current usage: spam, cookies, social networking site. [3]
- d) Give brief descriptions of the three main components of an Electronic mail. State the protocol used for email. List any 2 examples of mail access protocols. [6]