NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
JULY SUPPLEMENTARY EXAMINATIONS 2005

SUBJECT: COMPUTER NETWORKS AND APPLICATIONS
CODE: SCS 4202

Instructions to candidate:

1. Answer all 4 questions. Paper contains 6 questions

3Hours

QUESTION ONE

a) Explain why a packet filtering router should reassemble a packet that has been fragmented in the network and check its authentication header, instead of forwarding the fragments to the destination. [7]

b) Consider a system where a user is authenticated based on an ID and password that are supplied by the transmitter in plain text. Does it make any difference if the password and ID are encrypted? If yes explain why, if no haw would you improve the system. [8]

c) Explain why the processing required to provide privacy service is more complex than the processing required for authentication and for integrity [10]

QUESTION TWO

a) Random Early Detection (Discarding)-RED is a form of a congestion control mechanism explain in detail how it functions? [5]

b) What is the effect of RED on network throughput [5]

c) Discuss the fairness of the RED algorithm with respect to flows that respond to packet drops and nonadaptive flows (e.g. UDP) [5]

d) Discuss the implementation complexity of the RED algorithm [5]

e) Explain the importance of FIFO buffers in Routers with respect to congestion control [5]

QUESTION THREE

Explain the meaning of the following terms relating to internetworking

a) Internet
b) Subnet
c) Gateway
d) Protocol converter
e) Packet
f) Datagram
g) Hub
h) Switch
i) PDU
j) MAC Address
k) Frame
l) Plaintext
m) Ciphertext [25]

QUESTION FOUR

a) Explain in detail how the overheads associated with a user message increase as the message passes down through each protocol layer prior to transmission and decreases as it passes up through the layers on reception [15]

b) With reference to networking security explain the following terms

i) Privacy
ii) Authentication
iii) Integrity
iv) Asymmetric cryptography
v) Digital signature [10]

QUESTION FIVE

a) Explain the operations of the following devices

i) Digital repeater
ii) Analogue repeater
iii) Switch
iv) Hub
v) Bridge

[10]

b) Explain the following routing techniques
i) Source Routing
ii) Adaptive Routing
iii) Bridge Learning

[15]

QUESTION SIX

a) With the aid of a diagram explain the structure of the TCP/IP suite

[15]

c) Compare and contrast the OSI 7 layer reference model to the TCP/IP suite

[10]

END OF QUESTION PAPER