NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
DECEMBER EXAMINATION 2005

SUBJECT: COMPUTER SECURITY
CODE: SCS 4107

Instructions to candidate:

1. Answer any four questions. Paper contains Six questions.

3 HOURS

QUESTION ONE

a) What are the 3 major goals of computer security? [6]
b) List the 8 elements of computer security [8]
c) Explain any 6 common threats to computer physical security [11]

QUESTION TWO

a) How does the structure of TCP/IP present possible threats to computer system security? [3]

b) What is a network firewall? [2]

c) What are the 3 basic types of firewalls? [6]

d) What is the difference between a router and a proxy server? [4]

e) What is a DMZ and why is it necessary? [5]

f) How can the security and scalability of the DMZ be increased? [5]

QUESTION THREE

With respect to the RSA algorithm used in public key cryptographic systems. given that the prime numbers to be used are P =17. Q = 29 and E = 19.

a) Calculate the public Key Kp and the secret Key Ks which is generated by these values. [10]

b) Write two functions in Java or C/C++ to compute and return the numerical values of a ciphertext and to compute the plaintext of the ciphertext with respect to the RSA algorithm above. [15]

QUESTION FOUR

a) What are the two main classes of computer viruses? [4]

b) Briefly describe the action of the following viruses

i) File system or cluster
ii) Stealth
iii) Polymorphic
iv) Fast infector
v) Cavity

[10]

c) With respect to computer security differentiate between the following:

i) Blind Spoofing and Non-Blind Spoofing
ii) Authentication and Validation
iii) Network IDS and IDS
iv) Buffer overflow and Unhandled Input
v) System Integrity Verifiers and log file monitors

[10]

d) What is the difference between a worm and a virus? [1]

QUESTION FIVE

i) Compare the security on Windows and Unix platforms. [5]

ii) On windows which account is the most important and why. What basic steps can be taken to protect this account? [8]

iii) In application programming compare the security of applications written in C/C++ and those written in Java. Which would you consider more secure and why? Give examples (snippets of code) of such insecurities [6]

iv) What is the concept of an "information bucket" and what are the four factors a secure system must be able to control? [6]

QUESTION SIX

a) Explain the concept of a biometric security system and what instruments constitute such a system? [3]

b) What are the four requirements of a biometric feature to be used for authentication purposes? [4]

c) Which four biometric features are most suitable for authentication purposes? [8]

d) State any 4 measures, which reflect the effectiveness of a biometric authentication system [4]

e) In your opinion is biometrics more secure than passwords or not. Present a detailed account of your argument [6]

END OF QUESTION PAPER