



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Faculty of Computing and Informatics

Computer Science Department

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE HONOURS	
QUALIFICATION CODE: 07BACS	LEVEL: 8
COURSE: PRACTICAL NETWORK SECURITY	COURSE CODE: PTS811S
DATE: JULY 2019	SESSION: 2
DURATION: 2 Hours	MARKS: 87

SUPPLEMENTARY /SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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THIS QUESTION PAPER CONSISTS OF 3 PAGES
(Excluding this front page)

INSTRUCTIONS

1. Answer ALL the questions.
2. Write clearly and neatly.
3. Number the answers clearly.
4. Do not use additional materials
5. Cross out any work which should not be marked.
6. No pencil work allowed except for diagrams where requested.

Use the scenario below to answer the questions where reference is made. The answers should be relative to the context.

Scenario: The Namibia University of Science and Technology (NUST) is in the process of adopting a smart organisation solution to ensure timely efficient services to the students. This is to be based on their existing ICT infrastructures. A smart NUST will integrate ICT and IoT technology in a secure way to manage student information systems, libraries, transportation systems, hostel service, canteen, eLearning, MyNUST, other services over their smart devices, Personal Area Networks (PANs). Sensors integrated with real-time monitoring systems will be used to collect data from student's services provided on campus, network connection and activities on their devices for processing and analyses. The data collected will inform resource management decisions as well as the design of a security culture roadmap for the university. You are the CSO of NUST and you are responsible for the security of students, employees, guests and stakeholder information security and advising the management on how best to go about the smart NUST security management.

1. Introduction to Security [15 marks]
 - a. What is the advantage of having such a smart environment at NUST? [3 marks]
 - b. What challenges are you presented with as the smart NUST CSO? [4 marks]
 - c. In lab 1, you installed several programs to monitor network traffic in FCI labs.
 - i. What are some of the benefits of monitoring network traffic? [3 marks]
 - ii. Which tools are used to crack passwords based on lab 2? [3 marks]
 - iii. Name and explain 1 password attack (cracking technique). [2 marks]
2. Policing [15 marks]
 - a. With reference to the scenario, please answer the following questions based on the gallery walk we did on the topic. [7 marks]
 - i. In your opinion, what is the significance of organizational security policies? [2 marks]
 - ii. What role does policy play in InfoSec governance? [2 marks]
 - iii. Evaluate the role policy plays in corporate culture. [3 marks]
 - b. Which other policy will be specifically necessary for this setup? [1 mark]
3. Firewalls [12 marks]
 - a. In your lab session you focused on pfSense as your firewall solution. Why did you consider it a superior perimeter solution? [3 marks]
 - b. Using a detailed explanation, describe which firewall type you would choose for Smart NUST. [9 marks]
4. IDS/IPS [11 marks]

- a. What are the benefits of installing an IPS over an IDS in a smart NUST? [4 marks]
 - b. What are the design considerations for an IDPS in the smart NUST setup? [3 marks]
 - c. What would you consider when selecting IDPS for smart NUST? [4 Marks]
5. AAA [10 marks]
- a. Define any two core components of AAA using examples from the scenario provided focusing on the smart nature. [5 marks]
 - b. What are the three steps you follow in configuring local authentication? [3 marks]
 - c. How do you enable AAA on a router? [2 marks]
6. Cryptography [8 marks]
- a. Why would you recommend public key encryption algorithms over private for encryption and the sender's private key for signing the message? [4 marks]
 - b. NUST can benefit from using ciphers to conceal messages on the network. Ciphers belong to one of two cryptosystems, name and define. [4 marks]
7. Internet security [16 marks]
- a. Define the term ransomware in the context of the scenario. [3 marks]
 - b. How does the ransomware attack occur? [3 marks]
 - c. What are the impacts of a ransomware attack on NUST? [2 marks]
 - d. What security measures and solutions could be put in place to mitigate ransomware attacks at NUST? [4 marks]
 - e. Briefly explain how Internet protocols can be secured from attacks? [4 marks]

END!