# UNIVERSITY OF ESWATINI

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

## Main Examination

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**Course Name:** Security 1

**Course Code:** CSC 461

**Time allowed:** **Three (3)** Hours

**INSTRUCTIONS TO THE CANDIDATES**

1) Answer any **four (4)** questions out of the **five (5)** questions.
2) Each question carries **twenty-five (25)** marks.
3) This examination paper should **NOT** be opened until permission has been granted by the invigilator.
4) Number of marks per each question is written at the end of each question

**Question 1**

a. Computer security is a broad concept that can be defined based on security domains. Explain any four computer security domains. [8 marks]

b. Web data-driven applications are usually vulnerable to SQL-injection attacks. As a computer security expert;

   i) Explain what is meant by SQL-injection vulnerability by making use of a simple example [2 marks]

   ii) Explain how such vulnerabilities can be exploited by an attacker. [2 marks]

   iii) Explain how such vulnerabilities can be eliminated by good programming practice [2 marks]

c. Describe four computer security goals. [11 marks]

**Question 2**

a. The University of Eswatini is considering modifying the university's Information and Communication Technology (ICT) policy based on computer security instruments. The policy will guide the university, students and staff members on how to protect the university's computing devices from malicious attacks and also how to detect and react to computer security attacks. As a computer security specialist, giving relevant examples, explain three computer security instruments that should be incorporated in the ICT policy. [11 marks]

b. Explain the following encryption methods:

   i) Advanced Encryption Standard (AES) [7 marks]

   ii) Data Encryption Standard(DES) [7 marks]

**Question 3**

a. With the aid of relevant examples, explain the following computer security attacks:

   i) Social engineering [4 marks]

   ii) Man-in-the-middle (MITM) [4 marks]

   iii) Denial of service (DoS) [4 marks]

b. Encrypt the following plain text using Caesar cipher with a shift of 3;

   `I like computer security` [5 marks]

c. With the aid of an example, explain RSA encryption algorithm [8 marks]

**Question 4**

a. Describe what is meant by Demilitarized Zone in computer security [3 marks]

b. With the aid of relevant examples, explain STRIDE threat modelling and suggest possible solutions to each of the threats [16 marks]

c. Describe any three types of firewalls [6 marks]

**Question 5**

Compare and contrast Process for Attack Simulation and Threat Analysis (PASTA), Linkability, Identifiability, Nonrepudiation, Detectability, Disclosure of information, Unawareness, Noncompliance (LINDDUN) and Common Vulnerability Scoring System (CVSS) threat modelling [25 marks]