



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

PST 6178 INFORMATION SYSTEMS SECURITY AND AUDITING

Main Examination

November/December 2024

This Examination Paper consists of 5 pages

Time Allowed: 3 hours

Total Marks: 100

Internal Examiner: A. Mangena

External Examiner: Dr B Moyo

INSTRUCTIONS

1. Answer any 4 questions.
2. Each question carries 25 marks. Total Marks are 100.

ADDITIONAL MATERIALS NEEDED

1. Vigenere's Table
2. Scientific Calculators

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

Question One

a) Decrypt the cipher text code using Vigenere's Cipher. Use the key "zimbabwe" for all decryptions.

- SPUTITKYQXDFDJYXHWZ

[5 Marks]

Vigenere Tableau (Tabula Recta)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
C	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y

b) Using the Rail Fence Cipher on a key of 3. decipher the ciphertext code:

TNRTLNAIGAEFHEEETKCOEMS

[5 Marks]

c) Using the Caesars cipher decrypt the ciphertext "zmw" using a key of 2 shifts and show that

$$p = (c - k + 26) \bmod 26$$

where

c is the position of the ciphertext character in the alphabet.

k is the shift value (the key).

p is the position of the resulting plaintext character.

Show all your workings.

[10 marks]

d) Using the following information

Prime number- 23

Primitive root - 5

Show how the Diffie Helman algorithm can be used to encrypt the following secret and randomly generated numbers for Thabo and Rudo respectively.

Thabo- 6

Rudo- 15

[5 Marks]

Question Two

Explain Figure 2.1 In relation to the CIA Triad and any 5 principles of secure design

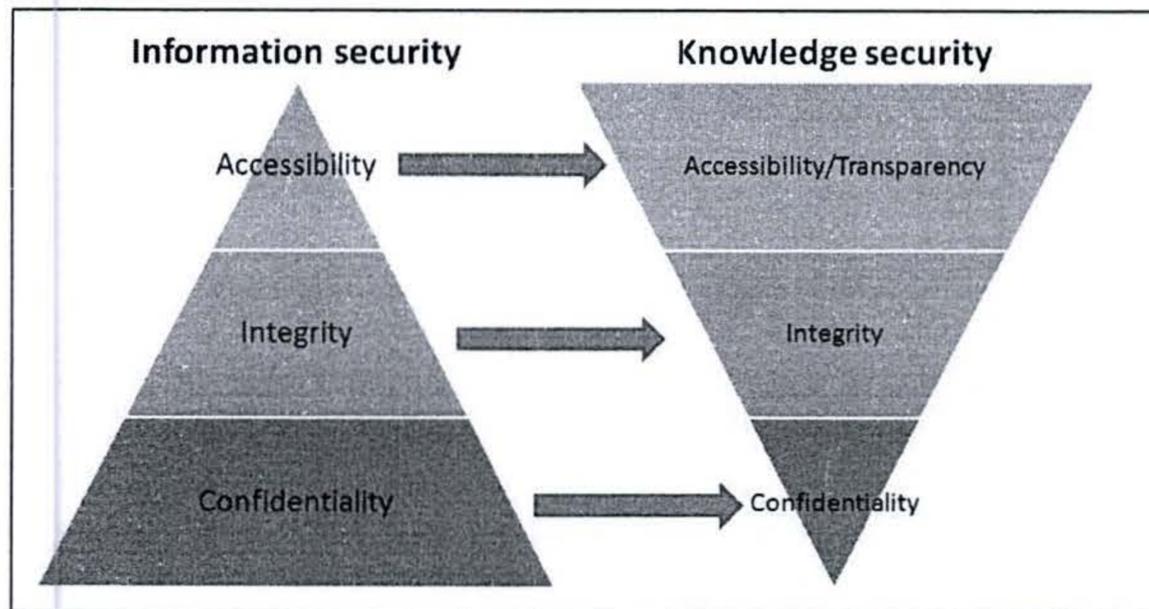


Figure 2.1

[15 marks]

- a) Compare and contrast the BIBA model and the Bel-Lapadula Model.

[10 marks]

Question Three

- a) Describe the phases of Developing an Information Systems Policy.

[15 marks]

- b) Compare the RSA Algorithm with the AES Algorithm.

[10 Marks]

Question Four

Show using examples how the following can be used in information security:

- a) Explain the value of CISA (Certified Information Systems Auditor).

[15 Marks]

- b) Discuss any general Controls used for Information Systems Audit and Control.

[10 Marks]

Question Five

The Data Protection Act [Chapter 11:12] (Data Protection Act) was gazetted on the 3rd of December 2021, and effectively came into force on the same day. In essence, the new data protection law mandates all business operating in Zimbabwe (and outside) to adhere to data protection and privacy principles when collecting data such as personal information of their customers or employees. In keeping abreast with new technology, businesses are therefore required to ensure that they implement systems which promote and protect data privacy as well as processing data fairly and securely.

Discuss efforts you could put in place in academic institutions to enforce this law.

[25 Marks]

~ End of Exam ~