UGANDA MARTYRS UNIVERSITY

UNIVERSITY EXAMINATIONS
FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEM

END OF SEMESTER FINAL ASSESMENT **SEMESTER**

1, 2022/2023

COURSE	:	**BACHELOR OF INFORMATION TECHNOLOGY**
PAPER	:	**INFORMATION & CYBER SECURITY**
CODE	:	**INCS2023**
SEMESTER	:	**ONE**
DATE	:	18/12/2023
TIME	:	9:30-12:30 PM
DURATION	:	**3 HOURS**

Instructions

3. *Attempt question 1 and any other 3 questions of your choice*
4. *Attempt only 4 Questions*
5. *Time Allowed 3 Hours Only*
6. *Use of relevant Illustrations/diagrams will earn you a bonus mark (s)*
7. *Remember to indicate the question number you have answered.*
8. *Write your name, course and registration number on all your answer sheets*
9. *All answers should be written on the answer booklet*
10. *All university rules apply*

Questions

1. In UMU, continuity is one of the key features to guarantee sustainability of UMU, one of the measures that can be employed to ensure continuity in UMU is to plan for any unforeseen incidents. As a cyber security expert, explain in details the incident response process that can be employed by UMU (25 Marks)

2. In Information security, attacks are categorized into two, Passive & active attacks, explain with three examples the meaning of each attack (10 Marks)

   b. Describe how Denial of service attack works. (6 Marks)

   c. Describe the difference between symmetric and asymmetric encryption, and provide an example of a situation where each is more appropriate (9 Marks)

3. Explain the meaning of security policy and why are they needed in an organization? (6 Marks)

   b. With examples, differentiate between web-based attacks and system-based attacks (6 Marks)

   c. Explain the seven layers of cyber security (13 Marks)

4. Explain with examples the CIA principles in cyber security (15 Marks)

   b. With examples explain what you understand by hardware attacks (10 Marks)

5. Explain how public key cryptographic works in cyber security? (10 Marks)

   i. Explain the advantages and disadvantages of secrete key cryptography (5 Marks)

   ii. Explain any five physical security countermeasures you can apply to ensure safety of IT devices in an organization (10 Marks)

6. As a cyber security expert for UMU, explain any four cyber security policies you could recommend to the university to ensure security and safety of IT systems. (8 Marks)

   b. Explain what digital signatures mean and state the advantages and disadvantages of digital signatures (10 Marks)

   c. Hash functions are called one-way function, explain the meaning of one-way functions (7 Marks)

7. In class we discussed the following PHP script for a login page (SQL Injection):

   $username = $_GET[user];

   $password = $_GET[pwd];

```
$sql = "SELECT *
        FROM usertable
        WHERE username = '$username'
        AND password = '$password' ";
$result = $db->query($sql);
if ($result->num_rows > 0) { /* Success */ }
else { /* Failure */ }
```

i. Explain why a URL where user is set to " ' or 1 = 1 -- " will result in a successful login. (4 Marks)

ii. Suppose we change lines 1 and 2 to (4 Marks)
$username = addslashes($ GET[user])
$password = addslashes($ GET[pwd])
NB: Recall that the addslashes function adds a slash before every quote. That is addslashes("a'b") will output the string "a\'b". Explain why this prevents the attack from part (a).

b. What is a hash function? (2 Marks)

c. Describe how hash functions work (10 Marks)

d. Explain the properties of a strong hash value (5 Marks)