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15CS61

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Cryptography, Network Security and Cyber Law

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly discuss the defense strategies and techniques to prevent intrusions. (06 Marks)
b. What is Chinese remainder theorem? Explain. Further, compute $f^{-1}(3, 5, 2)$, given $N = 210$, $n_1 = 5$, $n_2 = 6$, $n_3 = 7$ and $x_1 = 3$, $x_2 = 5$ and $x_3 = 2$ (compute x). (10 Marks)

OR

- 2 a. Define Hill Cipher. Consider a Hill Cipher using block size of 2 ($m = 2$). Calculate the Hill Cipher for a block and plaintext (H, I), given $K = \begin{pmatrix} 3 & 7 \\ 15 & 12 \end{pmatrix}$ (08 Marks)
b. With the help of a neat diagram explain the construction of DES. (08 Marks)

Module-2

- 3 a. Explain RSA algorithm with steps. Using RSA technique perform the encryption and decryption. For the given data: $p = 3$, $q = 11$, $e = 3$ and $m = (00111011)_2$. (08 Marks)
b. What do you mean by weak collision resistance and strong collision resistance? Discuss the attack complexity of both of these collision resistances. (08 Marks)

OR

- 4 a. With regard to cryptographic hash, explain the followings:
i) Hash-based MAC
ii) Digital signatures. (08 Marks)
b. Explain E_L Gamal Encryption. A block of plaintext has been encrypted using E_L Gamal encryption. Assume that $p = 131$, $g = 2$ and the recipients public key = 97. What is the plain text corresponding to the cipher text, $C_1 = 103$ and $C_2 = 51$? (08 Marks)

Module-3

- 5 a. What is Identity-based encryption? Explain the working of it. (06 Marks)
b. Write a note on certificate-based authentication. (04 Marks)
c. With the help of a diagram, discuss the sequence of messages exchanged between the client and Kerberos. (06 Marks)

OR

- 6 a. Briefly explain the Internet Key Exchange (IKE) protocol. Also discuss the various things accomplished in IKE phase 1. (08 Marks)
b. Show the sequence of messages and their contents involved in SSL handshake. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Write a note on E-mail worms. (04 Marks)
b. Briefly discuss the four main functions of a firewall. (06 Marks)
c. With a functional diagram indicate the tasks performed by an Intrusion Detection System (IDS). (06 Marks)

OR

- 8 a. What is SOAP? Briefly explain. (04 Marks)
b. With regard to web services security, discuss the followings:
i) WSDL and UDDI
ii) XML signatures
iii) SAML
iv) WS-Trust. (12 Marks)

Module-5

- 9 a. Enlist the objectives of IT Act. (03 Marks)
b. List any ten functions of the controller in IT Act. (10 Marks)
c. In which situations, the digital signature certificate is suspended? Briefly explain. (03 Marks)

OR

- 10 a. Discuss the penalties and adjudications under section 43 of the IT Act 2000 for damage to a computer, computer system etc. (08 Marks)
b. What is the punishment for cyber terrorism? Explain. (04 Marks)
c. As per IT Act, what is the constitution of advisory committee? Discuss. (04 Marks)
