CBCS SCHEME

USN

18CS744

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

Cryptography

Time: 3 hrs. Max. Marks: 100

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

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-1

1 a. Define following terms :
i) Cryptography
ii) Ciphertext
iii) Encryption
iv) Decryption
v) Kerchoff's principles. **(10 Marks)**

b. Perform simple cipher substitution for below message "meet me after the toga party" and explain the mathematical equations with key = 3. **(10 Marks)**

OR

2 a. With a neat diagram, explain the fiestel structure of DES method. **(10 Marks)**

b. Encrypt the message "Meet me at the usual place at ten rather than eight O'clock". Using the hill cipher with key $\begin{pmatrix} 9 & 4 \\ 5 & 7 \end{pmatrix}$. Show your calculation and result. **(10 Marks)**

Module-2

3 a. Perform encryption using RSA algorithm following P = 3, Q = 11, e = 3 and M = 9. **(10 Marks)**

b. Evaluate a Diffie – Hellman key exchange concept for prime number q = 71 and primitive root $\alpha = 7$.
i) If user A has private key $X_A = 5$, what is A's public key Y_A = ?
ii) If user B has private key $X_B = 12$, what is B's public key Y_B = ?
iii) What is shared key? **(10 Marks)**

OR

4 a. Compare how Diffie – Hellman key exchange algorithm useful in evaluating man – in – middle attack concept. **(10 Marks)**

b. Consider an Elgamal scheme with common prime q = 71, and primitive root $\alpha = 7$.
i) If B has private key $Y_B = 3$, and A choose the random integer k = 2, what is the ciphertext of M = 30?
ii) If A now choose a different value of k so that the encoding of M = 30, is c = (59, C_2) what is integer C_2? **(10 Marks)**

Module-3

5 a. Discuss elliptic curve cryptography for analog of Diffie – Hellman key exchange and explain with neat steps. **(10 Marks)**

b. Explain psecudorandom number generation based on asymmetric cipher. **(10 Marks)**

OR

6 a. Apply the distribution of public key with respect to directory, authority and certificate. **(10 Marks)**

b. Explain secret key distribution with confidentiality and authentication. **(10 Marks)**

Module-4

7 a. What are X.509 standards? Explain the structure of X.509 certificate with neat diagram. **(10 Marks)**

b. Explain Kerberos version 5 message exchange with neat diagram. **(10 Marks)**

OR

8 a. Write a note on:
i) S/MIME functionality
ii) Types of S/MIME message. **(10 Marks)**

b. Explain internet mail architecture with its key components. **(10 Marks)**

Module-5

9 a. Explain the applications of IPsec with example. **(10 Marks)**

b. Summarize the below :
i) IPSec documents
ii) IPSec services. **(10 Marks)**

OR

10 a. Explain transport and tunnel modes of operations in ESP. **(10 Marks)**

b. Explain ESP packet format with Top level format and substructure of payload data. **(10 Marks)**

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