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B.TECH.
(SEM VII) THEORY EXAMINATION 2017-18
CRYPTOGRAPHY & NETWORK SECURITY

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Find GCD(1970, 1066) by using Euclid's Algorithm.
 - b. What are the different factors on which Cryptography depends?
 - c. Compute the value of $5^{17} \bmod 11$ & $11^{17} \bmod 5$.
 - d. Find the value of Euler's Totient Number $\phi(88)$.
 - e. What is Cryptanalysis?
 - f. Discuss Linear and Differential cryptanalysis.
 - g. What is Birthday Attack?
 - h. Discuss Double & Triple DES.
 - i. Discuss Group & Ring with suitable axioms.
 - j. What is Security Attack? Discuss its various types.

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. How E-Mail security is achieved? Discuss S/MIME with suitable steps & block diagram.
 - b. Discuss DES in detail with suitable block diagram.
 - c. Discuss MD-5 Algorithm with all required steps and suitable block diagram.
 - d. Describe IDEA encryption and decryption in brief. Also explain. How can we generate cryptographically secure pseudorandom numbers?
 - e. What do you understand by Elgamel encryption system? Explain its encryption and decryption?

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain Digital Signature. Discuss signing & verifying process of Digital Signature Algorithm (DSA) in detail with suitable steps.
 - (b) Discuss X.509 digital certificate format. What is its significance in cryptography?
- 4. Attempt any one parts of the following: 10 x 1 = 10**
- (a) Why Message Authentication is required? Discuss working of MAC with suitable block diagram. Also discuss HMAC & CMAC in detail.
 - (b) What is Hash Function? Discuss SHA- 512 with all required steps, round function & block diagram.
- 5. Attempt any one parts of the following: 5 x 2 = 10**
- (a) Discuss Diffie Hellman key exchange method. Let $q = 353$, $\alpha=3$, $X_A= 97$ and $X_B = 233$. Then Compute Y_A, Y_B, K_A & K_B using Diffie Hellman.
 - (b) Discuss Public Key Cryptosystem. Explain RSA algorithm with suitable steps. Let $p= 17$, $q=11$, $e=7$ and $d=23$. Calculate the public key & private key and

show encryption and decryption for plain text $M= 88$ by using RSA algorithm.

- (c) What do you understand by Chinese Remainder Theorem? Solve the following congruent equations by Chinese remainder theorem:
- i. $X \equiv 2 \pmod{3}$
 - ii. $X \equiv 3 \pmod{5}$

6. Attempt any *two* part of the following: **5 x 2 = 10**

- (a) Explain Finite field of the form $GF(p)$ & $GF(2^n)$ with suitable example.
- (b) What is Block Cipher? Discuss Block Cipher Mode of Operations.
- (c) What do you understand by Feistel cipher structure? Explain with suitable block diagram.

7. Attempt any *one* part of the following: **10 x 1 = 10**

- (a) What is Kerberos? Discuss Kerberos version 4 in detail.
- (b) Write short note on the following:
 - i. SET
 - ii. Intrusion Detection
 - iii. Firewall
 - iv. AES