EXTC VII 21/12/16 CBUS
Elec : DCE

Q.P. Code : 788901

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **Compulsory.**
(2) Attempt **any three** questions out of remaining questions.
(3) Assume suitable data wherever necessary.

1. Answer in brief. **(Any Four)** **20**
   (a) Explain different redundancies in data and how they are used for data compression. Also give evaluation parameters for compression techniques.
   (b) What are the goals of cryptographic systems? Describe various attacks compromising these goals.
   (c) State Fermat's Little Theorem, Euler's Theorem in modular arithmetic. What is Euler's Totient function? Compute $\Phi(37)$, $\Phi(35)$, and $\Phi(75)$.
   (d) Give an example of each:
      - Substitution cipher
      - Transposition cipher
      - Stream cipher
      - Block cipher
   (e) Explain extended Euclid's algorithm, and compute multiplicative inverse of 7 modulo-160.

2. (a) Explain the principle of arithmetic coding. Hence generate a decimal tag for the sequence: **SWISS_ MISS.** Also decode the decimal tag. **10**

   (b) What are the advantages of minimum variance Huffman codes over normal Huffman codes? Design a minimum variance Huffman code on the sourse with alphabet A={ a1, a2, a3, a4, a5} with respective probabilities {0.25, 0.2, 0.15, 0.3, 0.1}. **10**

3. (a) Explain lossy and lossless schemes for image compression. Give an overview of JPEG-2000. **10**

   (b) Explain Frequency masking, Temporal masking with respect to audio compression. Also explain how an MP-III encoder works. **10**

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4. (a) Compute the encrypted and decrypted text using RSA algorithm for the plaintext 88. Public key is (n, e)=(187,7). 10

(b) Perform LZ-78 compression on the following string and find the compression ratio. 10001111010111100011111100011111 10

5. (a) Explain Triple-DES with two keys and the "Meet-in-the-middle-attack". 10

(b) Consider a Diffie-Hellman scheme with a common prime q=11 and a primitive root α =2. 10

(i) Show that 2 is primitive root of 11.
(ii) If user A has public key Y_A =9, what is A's private key X_A?
(iii) If user B has public key Y_B =3, what is the shared secret key K?

6. Write short notes on **(Any Four)**. 20

(a) Digital Signatures
(b) H.264. Video coding standard
(c) Ethical Hacking
(d) Digital Immune Systems
(e) Elliptic curves for cryptography
