

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VII (NEW) EXAMINATION – WINTER 2021****Subject Code:2170709****Date:25/11/2021****Subject Name:Information and Network Security****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Differentiate symmetric and asymmetric key cryptography. Draw the design model of symmetric key cryptography.	03
	(b) Use Playfair cipher to Decrypt the following message: “Must see you over Cadogan West. Coming at once” Key: EXAMPLE	04
	(c) Enlist block cipher modes of operation. Justify the use of Electronic Codebook (ECB) mode in Cipher Block Chaining (CBC) mode.	07
Q.2	(a) Differentiate the following: 1. Stream cipher and block cipher 2. Diffusion and confusion	03
	(b) Apply Railfence cipher approach and columnar(Advanced) Railfence cipher approach to Encrypt the following message: “Give me the top ten possible plaintexts” Key for Railfence cipher: 3 Key for Columnar(Advanced) Railfence cipher: [1 4 2 5 3]	04
	(c) Draw the design process of DES encryption and explain the round function of DES.	07
	OR	
	(c) Discuss the design principles of block cipher.	07
Q.3	(a) Discuss attack on double DES?	03
	(b) Encrypt the message $M = 9$ using RSA with the following parameters: $e = 3$ and $n = 5 \times 11$. Then regenerate the plaintext value back based on cipher text value.	04
	(c) Consider a Diffie-Hellman scheme with a common prime $q=11$ and a primitive root $\alpha=2$. (i) Show that 2 is a 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, shared with A?	07
	OR	
Q.3	(a) Define the following terms: Masquerade attack, Source repudiation and Destination repudiation	03
	(b) Discuss man-in-the middle attack on Diffie-Hellman key exchange.	04
	(c) Draw the design process of AES round function and explain the sub-nibble transformation and shift row mechanism in detail with example.	07

Q.4	(a)	Why HASH function is required in cryptography?	03
	(b)	Describe Birthday attack.	04
	(c)	Define Digital signature. Explain digital signature algorithm.	07
OR			
Q.4	(a)	Design RSA approach for digital signature standard.	03
	(b)	Define Message authentication code (MAC) and explain it in detail.	04
	(c)	Discuss SHA-512.	07
Q.5	(a)	Differentiate confidentiality and authentication.	03
	(b)	Discuss the advantages to use public key certificate over the public key authority in key distribution scenario.	04
	(c)	Enlist the various security protocols used at different layers of TCP/IP protocol stack and explain SSL protocol in brief.	07
OR			
Q.5	(a)	Discuss transport layer security.	03
	(b)	Use confidentiality and authentication approach to explain secret key distribution.	04
	(c)	Describe Kerberos.	07
