## B5.3-R4: NETWORK MANAGEMENT AND INFORMATION SECURITY

## NOTE:

- 1. Answer question 1 and any FOUR from questions 2 to 7.
- 2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours Total Marks: 100

1.

- a) What are the most commonly used cryptographic protocols for managing secure communication between a client and server over the Web?
- b) List and briefly explain the system security threats.
- c) Compare and contrast the problems and benefits of KDC and PKI.
- d) Briefly explain, why IPsec has not the same problem as TLS? Also indicate what is additionally needed in a IPsec based Virtual Private Network (VPN).
- e) Briefly explain the key elements of any security policy?
- f) Differentiate between Brute Force and Dictionary Attacks.
- g) What is Reverse Address Resolution Protocol?

(7x4)

2.

- a) Briefly explain the services provided by IPSec at the network layer.
- b) What are sweeps? Compare and contrast TCP/UDP sweeps and ping sweeps.
- c) Briefly explain the Distributed Denial-of-Service (DDoS) Attack.

(6+6+6)

3.

- a) Why there is need of security at every layer of Open System Interconnection (OSI) model. Discuss the security methods used at each layer of OSI model.
- b) Differentiate between symmetry and asymmetric key based cryptography. Given a symmetric and asymmetry system of n-users, how many keys are needed for pairwise secure communication?

(9+9)

4.

- a) How Pretty Good Privacy (PGP) ensures that an e-mail message or file just downloaded from the Internet is both secure and untampered? Discuss the authentication, confidentiality, compression, e-mail compatibility and segmentation services of PGP operations.
- b) How ITA 2000 provides legal framework for electronic governance by giving recognition to electronic records and digital signatures? Give few examples of offenses and the corresponding penalties.

(9+9)

5.

- a) Alice selects two prime numbers, p=5 and q=11, and public exponent e=3. Bob wants to send message (M)=4 to Alice. Compute the ciphertext generated by Bob and plaintext obtained by Alice.
- b) Let the elliptic curve is E:  $y^2 = x^3+2x+2 \mod 17$  and point on elliptic curve P = (5,1). Compute (i) 2P and (ii) 3P.

(6+12)

- 6.
- a) What is use of Simple Network Management Protocol (SNMP)? What capabilities are added by SNMP Version 3 to the previous versions? Discuss the Message format of SNMP version 3.
- b) What is Virtual Private Network (VPN)? List various activities performed by VPN. Discuss its components and types.

(9+9)

7.

- a) Is RC4 a block or stream cipher? Discuss the Key Scheduling Algorithm (KSA), Pseudo Random Number Generation Algorithm (PRNGA), Encryption and Decryption algorithms used in RC4 cryptosystem.
- b) What do you understand by System vulnerabilities? Do human factors cause vulnerabilities? If yes, explain some human factors that causes system vulnerabilities.

(10+8)