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FINAL EXAMINATION
SEPTEMBER 2018 SEMESTER

SUBJECT CODE	:	CTS609
SUBJECT NAME	:	TELECOMMUNICATIONS, NETWORK AND INTERNET SECURITY
LEVEL	:	MASTER'S DEGREE
TIME / DURATION	:	2.00 PM - 5.00 PM (3 HOURS)
DATE	:	6 JANUARY 2019

INSTRUCTIONS TO CANDIDATES

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1. Read the instructions given in the question paper CAREFULLY.

2. This question paper is printed on both sides of the paper.

3. This question paper consists of TWO (2) sections, Section A and B.

4. Answer ALL questions in Section A and Section B.

5. Write your answers in the answer booklet provided.

6. Answer all questions in English.

THERE ARE FOUR (4) PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

a) The Transmission Control Protocol/Internet Protocol (TCP/IP) model uses four layers to perform the functions of the seven-layer Open System Interconnection (OSI) model. Identify the matching functionality of TCP/ IP model and OSI model by filling the mapping table below.

TCP/IP Layers	OSI Layers
Process Layer	
Internet Layer	
Host-to-host layer	
Network Access Layer	

(4 marks)

b) Explain how one of TCP/IP standards namely Dynamic Host Configuration Protocol (DHCP) operates in order to simplify the management of IP configuration.

(6 marks)

[Total: 10 marks]

Question 2

A Virtual Private Network (VPN) provides the same network connectivity for remote users over a public infrastructure as they would have over a private network.

a) Describe how VPN characteristics support the CIA triad goals which are **confidentiality, integrity** and **availability**.

(6 marks)

b) Differentiate between **trusted VPNs** and **secure VPNs**.

(4 marks)

[Total: 10 marks]

Question 3

a) Pretty Good Privacy (PGP) and Secure/ Multipurpose Internet Mail Extension (S/MIME) are both protocols used for authentication and privacy to messages over the internet. Differentiate between these two protocols.

(4 marks)

b) The S/MIME incorporates three public-key algorithms which are Digital Signature Standard (DSS), Diffie-Hellman/ ElGamal and Secure Hash Algorithm (SHA-1) in order to provide a high level of security. Identify which cryptographic algorithms that must be used for the followings:-

i. Digital signatures.

ii. Encrypting session keys

iii. Hash functions

(6 marks)

[Total: 10 marks]

Question 4

Wired Equivalent Privacy (WEP) algorithm is used to protect wireless communication from eavesdropping and also to prevent unauthorized access to a wireless network. However, WEP has some vulnerabilities and it is covered by Wi-Fi Protected Access (WPA) and WPA2.

a) Explain **TWO (2)** comparison between WEP and WPA.

(4 marks)

b) Suggest **TWO (2)** solutions for WEP vulnerabilities.

(6 marks)
[Total: 10 marks]

SECTION B (Total: 60 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

A computer network consists of two or more computing devices connected to each other to share resources and information. Networks can be classified according to their geographical boundaries or their component roles and it may become a powerful tool when computers communicate and share resources with other computers on the same network.

a) Discuss how networks would enable effective **communication, share resources** and **facilitate centralized management of data**.

(12 marks)

b) Identify the **THREE (3)** common types of computer network. With appropriate examples, describe how each type of the network is used based on the geographical boundaries.

(8 marks)

[**Total: 20 marks**]

Question 2

Authentication is the act of confirming the truth of an attribute of a datum or entity which might involve confirming the identity of a person or software program, tracing the origins of an artifact or ensuring that a product is what it's packaging and labeling claims to be.

a) Describe the process of each of the **FOUR (4)** authentication types namely **password based authentication, certificate based authentication, e-token based authentication** and **biometric based authentication**.

(12 marks)

b) Explain how the Kerberos protocol works.

(5 marks)

c) Provide **TWO (2)** advantages of Kerberos authentication protocol.

(3 marks)

[**Total: 20 marks**]

Question 3

Network security is designed to protect the usability and integrity of network and data which includes both hardware and software technologies. Unauthorized intrusion into a computer system or network is one of the most serious threats to computer security.

Based on the above statement,

a) Discuss on computer and network security issues that can occur in any network environments and security issues specific to wireless environments.

(8 marks)

b) Provide **TWO (2)** standards related to computer and network security.

(4 marks)

c) Describe the Intrusion Detection System (IDS) architecture for a distributed collection of hosts supported by a Local Area Network (LAN) or internetwork.

(8 marks)

[Total: 20 marks]

END OF QUESTION PAPER