Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

COURSE NAME	:	NETWORK AND DATA COMMUNICATION
COURSE CODE	:	BIT 20703
PROGRAMME CODE	:	BIT
EXAMINATION DATE	:	JULY 2024
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER ALL QUESTIONS 2. THIS FINAL EXAMINATION IS CONDUCTED VIA ☐ Open book ☒ Closed book 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

PART A

Instruction: Choose the **BEST** answer for each of the following questions.

Q1 What is the benefit of using segmented network design?

(a) It simplifies network troubleshooting.

(b) It reduces network latency.

(c) It allows for easier scalability.

(d) It increases network security.

(2 marks)

Q2 What is the purpose of Quality of Service (QoS) in network design?

(a) To prioritize certain types of network traffic.

(b) To encrypt all network communications.

(c) To provide redundancy in the network.

(d) To segment the network into smaller parts.

(2 marks)

Q3 Which of the following is **NOT** a common security measure for protecting against phishing attacks?

(a) Antivirus software.

(b) Email filtering.

(c) User awareness training.

(d) Two-factor authentication.

(2 marks)

Q4 A company's network experiences a ransomware attack, encrypting critical data and demanding payment for decryption.

What security measure should the administrator implement to protect against ransomware attacks?

(a) Regular data backups.

(b) Intrusion Prevention System (IPS).

(c) Biometric authentication.

(d) Virtual Private Network (VPN).

(2 marks)

Q5 Which of the following is **NOT** a common security measure for protecting against malware?

(a) Antivirus software.

(b) Firewalls.

(c) Intrusion Detection System (IDS).

(d) Encryption.

(2 marks)

Q6 What is the purpose of redundancy in network design?

(a) To increase network security.

(b) To decrease network latency.

(c) To provide backup in case of network failures.

(d) To reduce network complexity.

(2 marks)

Q7 How are the Open System Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) models similar?

(a) Both have seven layers.

(b) They have identical application layers.

(c) Both have comparable transport and network layers.

(d) Both use only circuit-switched technology.

(2 marks)

Q8 The loopback address is used for _____ in IPv4.

(a) communication with devices on the same local network

(b) communication with devices on different networks

(c) communication with oneself for testing purposes

(d) identifying the default gateway

(2 marks)

Q9 The purpose of a default gateway in a TCP/IP network is _____.

(a) to assign IP addresses to devices on the network

(b) to provide a central point for network monitoring

(c) to forward packets to destinations outside the local network

(d) to manage domain name resolution

(2 marks)

Q10 Which of the following IP address classes is designed for small networks and can have a maximum of 254 hosts per network?

(a) Class A

(b) Class B

(c) Class C

(d) Class D

(2 marks)

PART B

Q11 You have been assigned to design network infrastructure for a SecRed Corporation that operates in multiple locations worldwide. The company consists of four departments: Sales, Marketing, Finance, and Human Resources, each with its own set of network requirements. Additionally, the company has two branch offices located in different location (Melaka and Selangor). The network design must include a Demilitarized Zone (DMZ) area with several servers such as web servers, email servers, and database servers, multiple switches and routers to connect the departments and branches, and a firewall to protect the network perimeter.

Based on the given scenario, answer the following questions.

(a) Draw a network diagram for SecRed Corporation. Label your diagram.

(7 marks)

(b) Explain the purpose of the firewall in network security and how it helps to protect internal resources from external threats.

(2 marks)

(c) Describe the role of each server hosted in the DMZ.

(3 marks)

(d) Suggest **FOUR (4)** approaches to mitigate network attacks to SecRed Corporation.

(8 marks)

Q12 Discuss **FIVE (5)** defence strategies against application-level Trojan Horse backdoor tool attacks.

(10 marks)

Q13 Answer **ALL** questions.

(a) State the function of Data Link Layer in OSI layers.

(2 marks)

(b) Compare the following Data Link sublayer protocols:

(i) Logical Link Control (LLC)

(4 marks)

(ii) Media Access Control (MAC)

(4 marks)

Q14 Answer **ALL** questions.

(a) State **THREE (3)** reasons for performing error detection and correction with transmitted data through computer network.

(6 marks)

(b) Describe the process of performing error correction for the following methods:

(i) Checksum

(4 marks)

(ii) Parity Check

(4 marks)

(iii) Cyclic Redundancy Check (CRC)

(6 marks)

Q15 Given the following scenario:

Miniminimo Networks Sdn Bhd has hired you to advise on their new high speed enterprise network. After interviewing its IT Head, Dr. Magomed, the following information has been determined:

Headquarters: Kuala Lumpur

No.	Department	Number of network node required
1.	Deployment Access	155
2.	Deployment Infra	120

Southern Branch: Batu Pahat

No.	Department	Number of network node required
1.	Sales	122
2.	Executives	10

Three legal IPs have been purchased from Jaring - 199.10.1.0, 199.10.2.0, 199.10.3.0 each with default subnet mask 255.255.255.0. Besides that, they also have decided to provide an email service to their staff, a web site to promote their company and a streaming server. All nodes will be accessing the Internet using these legal IP, no internal IP addressing is allowed.

(a) Produce a table that tabulates all the subnets. Consider the following information to be included in your table:

- Given IP
- Subnet Address
- Subnet Mask
- Number of Host Supported
- Number of Host Needed
- Address Range
- Broadcast Address
- Gateway Address
- Assigned to which department.

(8 marks)

(b) Using your table in **Q15(a),** generate address configurations for the following devices:

(i) **ONE (1)** router.

(2 marks)

(ii) **ONE (1)** server.

(2 marks)

(c) Write a configuration command for the following network devices:

(i) **ONE (1)** router (choose any).

(4 marks)

(ii) **ONE (1)** switch (choose any).

(4 marks)

- END OF QUESTIONS -