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 PRIFYSGOL CYMRU Y Drindod Dewi Sant UNIVERSITY OF WALES Trinity Saint David	LLEOLIAD - COLEG SIR GAR, LLANELLI
LOCATION - COLEG SIR GAR, LLANELLI	
LEVEL 4	LEVEL 4
EXAMINATION PERIOD MAY 2022	CYFNOD ARHOLIADAU MAY 2022

MODULE CODE: ACCA4024
NETWORKING & CYBER SECURITY ESSENTIALS

TIME: 2 HOURS

ANSWER ALL QUESTIONS

Equipment or materials required – None

The Candidates are not permitted to bring calculators, dictionaries; text books/case studies or any other reference materials into the exam room.

Show all your calculations in your final answers

ANSWER ALL FOUR QUESTIONS

QUESTION ONE

Attempt all of the following. Electronic Calculators are not permitted. Write down and show all your manual calculations in your exam book.

- i) A consumer places his debit card close to a pay terminal at a shop and the shopping charge is successfully paid. Which type of wireless technology was used? (3 marks each)

- A. Bluetooth,
- B. RFID
- C. **Wi-Fi**
- D. 3G

ii) The layer which describes how a device accesses and sends data over the network media in the TCP/IP model? (3 marks each)

- A. application
- B. internet
- C. transport
- D. **network**

iii)

What is the maximum size of a valid Ethernet frame? (3 marks each)

- A. 1522 bytes
- B. **1518 bytes**
- C. 1400 bytes
- D. 2048 bytes

iv) A network design engineer has been asked to design the IP addressing scheme for a customer network which requires 255 hosts. The network design engineer decides to use IP addresses from the 192.168.10.0/24 network. Will this IP addressing scheme accommodate all the hosts in the customer network? (3 marks each)

- A. **No, the network is not having required usable hosts**
- B. Yes, the network is having the required usable hosts

v) DHCP is used to automatically assign IP address to hosts. (3 marks each)

- A. **True**
- B. False

vii) Private IP addresses are designed to be exclusively used for external networks and they can be used on the Internet (2 marks)

- A. True
B. False

✓ (2)

viii) The URL identifies the MAC address of the web server (3 marks)

- A. True
B. False

X

ix) Hypertext Transfer Protocol is used by web servers to serve up a web page (2 marks)

- A. True
B. False

✓ (2)

x) Streaming audio and video applications require receipt of all packets regardless of delay. (3 marks)

- A. True
B. False

✓ (3)

Q1-19.

(25 marks total)

QUESTION TWO

You have a job interview for an advertised role of Network Support Technician in Coleg Sir Gar as part of the Interview process the IT manager has asked you to explain the OSI & TCP/IP models. He wants you to include the following information in your explanation.

- Purpose of the OSI & TCP networking models
- Give a definition and explain the purpose of the 7 layers of the OSI network model
- Give a definition and explain the purpose of the 5 layers of the TCP/IP network model
- Explain the differences between the OSI & TCP/IP models

(25 marks total)

The OSI Model

Application – Home of the protocols and services that comprise an application ✓

Presentation – Ensures that the data/information is presented in a format the device can understand ✓

Session – Manages connections and terminations between connected computers ✓

Transport – manages data transfers, and checks transmitted data is the same as received data ✓

Network – Addresses and delivers data in between networks ✓

Data link – Transfers data across the network media ✓

Physical – The physical connection between devices ✓

(7)

The TCP/IP Network model

Application – Group of applications that require communication with the network host ✓

Transport – Responsible for the connections between the applications and the network (TDP / UDP) ✓

Network – This layer is responsible for creating packets that move across the network ✓

Data link – This layer is responsible for creating frames that move across the network ✓

Physical – This is where the transceiver drives the signals on the network ✓

(5)

The Differences between the TCP/IP model and the OSI Model

- The TCP/IP model has 5 layers while the OSI model has 7 ✓ (1)
- The OSI model follows a vertical approach while the TCP/IP follows a horizontal approach ✓ (1)
- The OSI model is used for troubleshooting, and locating issues as this model is broken down more ✓ (1)
- The Application layer of the TCP/IP model is basically the application, session and presentation layer of the OSI model but merged together ✓ (1)
- The OSI model is more theoretical and used to build networks ✓ (1)
- The TCP/IP model is what is actually happening inside a computer ✓ (1)

Q2 total - 18.

QUESTION THREE

You were successfully in getting the Network Support Technician role in Coleg Sir Gar and the IT manager wants you to explain the purpose of IP addresses & Mac Addresses to the new IT apprentice. He wants you to include the following information in your explanation.

- Give a definition and purpose of IP addresses
- What OSI layer is responsible for IP addresses
- What is the difference between IP version 4 and version 6 IP addressing and what is the reason for developing IP version 6 addresses
- Give a definition for different IP address classes and their purpose
- What is the purpose of network address translation
- Give a definition and purpose of Mac addressed
- What is the length of a mac address in bytes
- What OSI layer is responsible for Mac addresses

• What are the 2 different types of mac addresses and what are their purpose
IP addresses are addresses that allow your device to be found online, it is a way for it to be identified. The 'Data Link' layer of the OSI model is responsible for IP addresses. IP version 4 addresses are 32 bits long and contain 132 binary digits, whereas IP version 6 addresses contain 128 bits. This means more unique identifies could be created using IP version 6 addresses. There are different classes of IP addresses, they are as follows:

Class A (3 Octets) = 1.0.0.0 – 126.255.255.255
Class B (2 Octets) = 128.168.0.0 – 191.255.255.255
Class C (1 Octet) = 192.168.0.0 – 223.255.255.255
Class D / Multicast = 224.0.0.0 – 239.255.255.255
Class E / Experimental = 240.0.0.0 – 255.255.255.255

Network Address Translation (NAT) enables one IP address to be represented as a group and conserves IP addresses in order for private or unregistered IP addresses to get online.

MAC addresses are also unique identifiers. The 'Network' layer of the OSI model is responsible for MAC addressing. MAC addressing can either be static or dynamic, static MAC addressing means the address was created manually and cannot be changed. Dynamic MAC addressing means the address was learnt via an ARP request, and the address can be changed.

Q3 - 6 marks

(20 marks total)

QUESTION FOUR

It's the second week being employed as a Network Support Technician role in Coleg Sir Gar and the IT manager is off ill with Covid 19 so you are now response for all the network security of the college LAN and WAN. The principle is very worried about the potential risks of unauthorised access of the college network and he wants to better understands the ways to protect the network from unauthorised data access.

You need to include the following in your discussion:

Definition and purpose of both hardware and software firewalls and explain how they can prevent unauthorised access of data.

Definition and purpose of network ports on firewalls and discuss which ports do you always need to be open on the firewall and discuss common ports which can often be closed.

What is the purpose and benefits of having a 'Demilitarized' zone established as one of the security techniques to try to prevent unauthorised access to data.

Definition and purpose of different types of 'Intrusion Detection systems' which can be employed to prevent unauthorised access of data.

Hardware and software firewalls prevent unauthorised access by filtering incoming and outgoing traffic and creating a barrier between the LAN and the internet. Demilitarized zones

prevent unauthorised access by placing the organisations external-facing services on untrusted networks. Demilitarized zones protect the area between the LAN and the public internet. Intrusion Detection Systems monitor the system/network for any type of suspicious activity and attempt to block and attack this activity.

Q4 part A - 4 marks (10 marks)

Explain the purpose within a network of the following networking hardware devices Modem, Routers, Switches, Hubs in your explanation discuss if these devices are intelligent or not and also include which network layer they are located.

Modems are device that send signals between devices to make them more compatible, Modems are not intelligent. Routers are intelligent devices that provide us with internet connection, it sends packets of data to switch packets, networks and subnetworks. Switches are also intelligent devices which sends all packets to all devices which are physically connected via the port. Hubs are devices which are not intelligent, the hub sends specific packets to specific devices which are physically connected via the hub's ports.

Q4 part B - 5 marks

Q4 total - 9 marks (10 marks)
(20 marks total)

QUESTION FIVE

i) While configuring Wireless access points/ wireless routers, which type of device filtering technique is used to enhance the security? (2 marks)

- A. Authentication
- B. Encryption
- C. IP Address
- D. MAC Address

✓ (2)

ii) In Wireless networks, which wireless security initiative helps to secure sensitive information during data transit? (2 marks)

- A. Authentication
- B. Encryption

- C. IP Address filtering
- D. MAC Address filtering

✓ (2)

iii) The function that provides secure remote access to servers? (2 marks)

- A. DNS
- B. DHCP
- C. SSH
- D. Telnet

X.

iv) One of the below commands communicates with the name server for details about the destination domain is (2 marks)

- A. Ping
- B. Tracert
- C. nslookup
- D. netstat

✓ (2)

v) The Ping command is used to... (2 marks)

- A. test the end to end connectivity between hosts
- B. display the network connections
- C. display the route information from source to destination
- D. none of the above

✓ (2)

(10 marks total)

Q5 - 8.