

PROGRAM : NATIONAL DIPLOMA
ENGINEERING : COMPUTER SYSTEMS
ENGINEERING : ELECTRICAL

SUBJECT : **NETWORK SYSTEMS 2**

CODE : **CNS211**

DATE : WINTER EXAMINATION
3 JUNE 2019

DURATION : (SESSION 1) 08:30 - 11:30

WEIGHT : 40 : 60

TOTAL MARKS : 108

ASSESSOR : DR PR BARON

MODERATOR : MR V RAMESHAR 2411

NUMBER OF PAGES : 7 PAGES AND 1 ANSWER SHEET

INSTRUCTIONS

1. THE ANSWER SHEET MUST BE HANDED IN TOGETHER WITH THE SCRIPT
 2. POCKET CALCULATORS PERMITTED.
 3. ATTEMPT ALL THE QUESTIONS.
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INSTRUCTIONS TO STUDENTS

1. 100 MARKS = 100%. TOTAL MARKS AVAILABLE = 106
 2. ATTEMPT ALL QUESTIONS.
 3. ALL DIAGRAMS AND SKETCHES MUST BE DRAWN NEATLY, IN PROPORTION AND LABELLED CLEARLY.
 4. THE MARK ALLOCATION SHOULD BE CONSIDERED WHEN ANSWERING QUESTIONS.
 5. ALL WORK DONE IN PENCIL EXCEPT DIAGRAMS AND SKETCHES WILL BE CONSIDERED AS ROUGH WORK AND WILL NOT BE MARKED.
 6. QUESTIONS MAY BE ANSWERED IN ANY ORDER, BUT ALL PARTS OF A QUESTION MUST BE KEPT TOGETHER.
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SECTION A

This section is to be answered on the sheet provided. Mark an **X** over the corresponding block on your answer sheet. Hand in your answer sheet with your answer script.

QUESTION 1 - TRUE OR FALSE STATEMENTS

Answer true for a statement which you agree with and false to statements that you disagree with.

- | | |
|---|-----|
| 1.1. The term interface refers to how the device can allow two different networks to communicate. Routers connect to different networks, and the specialized NICs on routers are simply called interfaces. The interface on a router device has a unique physical address and appears as a host on the local network. | T/F |
| 1.2. The organizations that standardize networking protocols are the Institute of Electrical and Electronics Engineers (IEEE) and the Internet Engineering Task Force (IETF). | T/F |
| 1.3. The 1000BASE-SX media standard can be used to connect devices as far as 550m. | T/F |
| 1.4. The entries in the switch's IP table acquired by the learning process are time stamped. This timestamp is used as a means for removing old entries in the IP table. After an entry is made in the IP table, a procedure begins a countdown, using the timestamp as the beginning value. | T/F |
| 1.5. Network bandwidth is the measure of the data-carrying capacity of the switch. | T/F |
| 1.6. According to CSMA/CD, a node should not send a packet unless the network is clear of traffic. If two nodes send packets at the same time, a collision occurs and the packets are lost. | T/F |
| 1.7. For each different media speed, a period of time is required for a bit to be placed and sensed on the media. This period of time is referred to as the bit time. | T/F |

QUESTION 1 (Continued)

- 1.8. Slot time is used to establish the maximum size of an Ethernet frame. T/F
- 1.9. A generic term for an end device that sends or receives messages is a host. A host can be one of several pieces of equipment performing a wide variety of functions. T/F
- 1.10. For an Ethernet frame to be placed on the LAN media, it must have a destination MAC address. In a transmitting device, when an IPv4 packet is sent to the data link layer to be encapsulated into a frame, the device must identify the data link layer address that is mapped to the destination IPv4 address. To find this MAC address, the node refers to a table in its RAM memory called the ARP table or the ARP cache. T/F
- [10]**
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QUESTION 2 - MULTIPLE CHOICE

Choose the most correct answer and mark an x over the corresponding letter on your answer sheet (rough work can be done at the back of the answer script). Each question counts 2 marks.

- 2.1 Which type of network provides customers with limited access to corporate data such as inventory, parts lists, and orders?
- A) Intranet
 - B) Internet
 - C) Internetwork
 - D) Extranet
- 2.2 The OSI has seven layers? What is layer 5?
- A) Network
 - B) Application
 - C) Presentation
 - D) Transport
 - E) Session
- 2.3 Which of the following describes a connection to a switch port?
- A) Isolates broadcasts
 - B) Is a separate collision domain
 - C) Uses the MAC address of the switch port as the destination
 - D) Regenerates every bit that arrives out every port on the switch
- 2.4 What is the purpose of cladding in fibre-optic cables?
- A) Isolates broadcasts
 - B) Prevention of light loss
 - C) Cable grounding
 - D) Noise cancellation
 - E) EMI protection

QUESTION 2 (Continued)

- 2.5 An e-mail message is sent from Host A to Host B on a LAN. Before this message can be sent, the data must be encapsulated. Which of the following best describes what happens next after a packet is constructed?
- A) The packet is transmitted along the medium.
 - B) The packet is encapsulated into a frame.
 - C) The packet is segmented into frames.
 - D) The packet is converted into binary format.
- 2.6 Which of the following protocols are typically used in WANs?
- i) 802.11
 - ii) Ethernet
 - iii) HDLC
 - iv) PPP
- A) iii and iv
 - B) i and iv
 - C) ii and iv
 - D) ii and iii
 - E) none of the above

[12]

SUB TOTAL SECTION A: 22

SECTION B

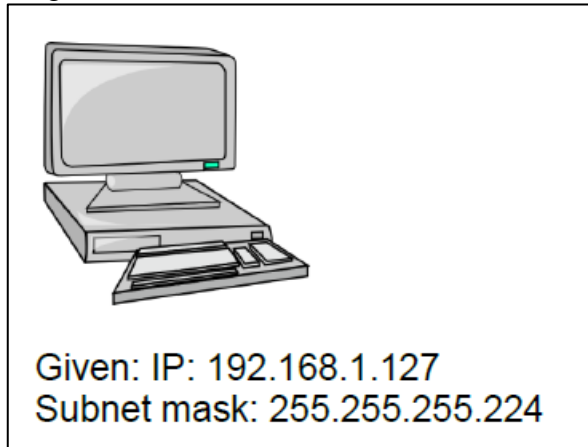
This section is to be answered on your answer script.

QUESTION 3 LAB WORK ASSESSMENT

- 3.1 Using your knowledge of the Cisco IOS, provide a configuration sequence for the following requirements for the Cisco switch 2600 series. The points below may not be in the correct order but you need to provide your configuration in the order that will work best. (13)
- o Hostname: THOR
 - o Turn on vlan1 and IP address for vlan 1: 192.168.2.2
 - o Gateway: 192.168.2.254
 - o Password: Ruth!
 - § Encrypted level 7
 - o Enable secret: Rachel!#
 - o Passwords for console port and telnet: ross
 - o Banner: "For authorised personnel only. No unauthorised access"
 - o Port security: limit all ports to 1 MAC address. If violated, shutdown port.
 - o Set FastEthernet /04 to half duplex at 100Mbps
 - o Enable status messages of the switch
 - o Save your configuration.

- 3.2 Consider figure 3.1. The client was given an IP address but is unable to connect to the network and the internet. Solve the problem that has occurred for this client. (5)

Figure 3.1



- 3.3 An organisation needs 100 hosts per subnet. They bought a class A address 10.0.0.0
Determine the hosts for this network. Write the first 3 ranges in your answer. Also, determine the available subnets for this network as well as how many hosts are available. (7)
[25]

QUESTION 4

- 4.1 Explain in detail how the layer 4 of the OSI model is able to track individual communications. You may draw a picture or two to assist your explanation. (8)
- 4.2 The networking standards rely on a layered setup. Provide an explanation for the sending and receiving process from the user who generates data from one PC, all the way to the receiving end where another user receives this message. In your explanation please discuss the OSI layers that are used and how and what their respective roles are. Draw a fully labelled diagram showing the all the layers and how the data moves through. For each stage provide the correct terminology that is applicable to the layer in question. For example, in the physical layer we send bits to and fro in the media that connects the two computers while in other layers other names are used for the PDUs. (Look at the mark allocation) (20)
- 4.3 Provide a detailed explanation of the Peer-to-Peer (P2P) networking model. Provide 2 possible real-world applications of this model. Draw at least 1 diagram to illustrate your answer. (6)
- 4.4 You have just opened your new company and designed a great looking website. Your website was registered with Afrihost ISP. You now enter your new URL address into your web browser and it presents your website

to you obtained from the internet. How does your web browser know where to find your web pages when you enter the URL into the address line? What is the process that takes place that allows this to happen? Provide a full explanation but please note that this is not a question about OSI layers.

(8)

4.5 What command can be used to:

(5)

4.5.1 Check if packets are being sent correctly across a LAN?

4.5.2 View a listing of how a network packet travels through the network and where it may fail or slow down?

4.5.3 To show the IP and MAC address of all the interfaces on a PC?

4.5.4 Enable a user to do a reverse lookup on an IP address of a domain or host on a network.

4.5.5 Display the TCP/IP network protocol statistics and information. To show all the ports and connections to the outside world that is taking place on the computer?

4.6 When would you use TCP and when would you use UDP. Provide reasons for your answer.

(5)

4.7 What are the two main functions that the data link layer performs?

(2)

4.8 What control information is required in terms of creating frames?

(3)

4.9 Differentiate between CSMA/CD and CSMA/CA. Provide a detailed answer. Provide an example of where each are used.

(4)

[61]

SUB TOTAL SECTION B: 86

TOTAL: 108
FULL MARKS: 100

STUDENT SURNAME: _____

STUDENT NUMBER: _____

ANSWER SHEET*(This sheet must be handed in with your examination script)**Put a large clear cross(X) over the box you have chosen as your answer.***QUESTION 1**

1.1	True	False
1.2	True	False
1.3	True	False
1.4	True	False
1.5	True	False

1.6	True	False
1.7	True	False
1.8	True	False
1.9	True	False
1.10	True	False

(10)

QUESTION 2

2.1	A	B	C	D	E
2.2	A	B	C	D	E
2.3	A	B	C	D	E
2.4	A	B	C	D	E
2.5	A	B	C	D	E
2.6	A	B	C	D	E

(20)
[30]