



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY 2018

COURSE NO: CE 472
COURSE NAME: NETWORK PRINCIPLES
CLASS: CE IV **TIME:** 3 HOURS

Name: _____ Index Number: _____

INSTRUCTIONS: Attempt **All** questions in **SECTIONS A, SECTION B** and **ONLY ONE** question in **SECTION C**. You are advised not to spend more than 1 hour on **SECTION A**. Section A is **40 Marks**.

SECTION A

Answer All Questions on the question paper by circling or ticking (✓) the correct answers.

1. Which OSI layer handles addressing on the local physical network?
 - a) Transport
 - b) Network
 - c) Data Link
 - d) Presentation
2. Which one of the following devices operates at the Physical Layer of the OSI model?
 - a) Repeater
 - b) Router
 - c) Bridge
 - d) Server
3. Which IEEE 802.3 media standard is commonly called "thicknet?"
 - a) 10Base36
 - b) 1Base5
 - c) 10Base5
 - d) 10BaseT
4. Which of the following is not a characteristic of bridges?
 - a) Can join multiple physical networks and reduce network traffic
 - b) Ability to handle multiple paths between networks

- c) Operates at the Data Link Layer of the OSI model
 - d) Stops broadcast storms from spreading
5. How many hosts are on the network 172.16.41.0/27?
- a) 65,534
 - b) 32
 - c) 254
 - d) 30
6. What is the fastest routable protocol suite available?
- a) TCP/IP
 - b) IPX/SPX
 - c) TFTP
 - d) NetBEUI
7. Which of the following is not a component of a packet?
- a) Header
 - b) Data
 - c) CRC
 - d) MAC address
8. Which of the following is not true about token passing?
- a) Token passing is a form of access method
 - b) Tokens are passed from network device to network device around a ring
 - c) Token passing is only used in a Token Ring network
 - d) It is theoretically impossible to have a collision on a Token Ring network
9. How many subnets are created by the address 192.168.1.0 255.255.255.248
- a) 8
 - b) 64
 - c) 32
 - d) 16
10. Which type of media access method is used by IBM-based LANs with MAUs?
- a) Token passing
 - b) Demand priority
 - c) CSMA/CD
 - d) CSMA/CA

11. What is another name for 10Base5 cable?
- a) Ethernet
 - b) Twisted-pair
 - c) Thinnet
 - d) Thicknet
12. The IEEE 802.3 committee specifies standards for CSMA/CD networks such as Ethernet. What is the maximum segment length for 10Base2 cable?
- a) 100 meters
 - b) 185 meters
 - c) 250 meters
 - d) 500 meters
13. Which type of media access method is commonly used by Ethernet networks?
- a) Token passing
 - b) Demand priority
 - c) CSMA/CD
 - d) CSMA/CA
14. A twisted-pair adapter will have a(an) _____ connector:
- a) RJ-11
 - b) RJ-45
 - c) BNC
 - d) AUI
15. A network using UTP with Category 3 cabling operates at
- a) 2 Mbps
 - b) 4 Mbps
 - c) 10 Mbps
 - d) 20 Mbps
16. ATM uses what types of technology?
- a) Cell switching
 - b) Virtual circuits
 - c) Quality of Service guarantees
 - d) A and B
17. Which of the following is a packet-switching technology that checks each packet for errors?
- a) X.25
 - b) Frame Relay
 - c) SMDC
 - d) RAS
18. A file is downloaded to a home computer using a 56 kbps modem connected to an Internet Service Provider. If the download completes in 2 minutes, estimate the maximum size of data downloaded.
- a) Interface fastEthernet 1/0 IP address 2001: AB00:00FF:1: :/64 eui-64
 - b) Interface fastEthernet 1/0 IPv6 address 2001: AB00:00FF:1: :/64 eui-64
 - c) Line con 0 IPv6 address 2001: AB00:00FF:1: :/64 eui-64
 - d) Interface fastEthernet 1/0 IPv6 address 2001: AB00:00FF:1/64 eui-64

19. Which of the following is a valid command to apply an IPv6 address to a router interface?
- a) 8 bits
 - b) 16 bits
 - c) 32 bit
 - d) 64 bits
20. You are consulting for a physician's office that is already wired to use thinnet. The physicians want to upgrade to have a faster network. What is the speed of the current network?
- a) 10 Mbps
 - b) 10 Gbps
 - c) 1.85 Mbps
 - d) 56 Kbps
21. Which service would you use to log on to a remote system and work on that system as if you were sitting in front of a local workstation at that location?
- a) FTP
 - b) Telnet
 - c) E-mail
 - d) HTTP
22. Your network is currently busy and your monitoring shows that it has discovered frames with errors and there are retransmissions to correct the errors. The layer of the OSI model that is handling the error checking is the _____, which is using _____ information.
- a) Physical layer, analog
 - b) Data Link layer, CRC
 - c) Presentation layer, encoding
 - d) Application layer, remote sharing
23. What is the broadcast ID of the seventh subnet created using 172.16.0.0/28?
- a) 172.16.0.111
 - b) 172.16.111.0
 - c) 172.16.0.0
 - d) 172.16.0.96
24. Assuming the default switch configuration which VLAN range can be added, modified or removed on a CISCO switch?
- a) 2 through 1001
 - b) 1 through 1001
 - c) 1 through 1002
 - d) 2 through 1005
25. When using an 8-port 10 megabits/second switch, if two machines are sending packets between each other, what is the bandwidth available to the two machines communicating?
- a) 10 Mbps
 - b) 8 Mbps
 - c) 100 Mbps
 - d) 20 Mbps

26. _____ can be reduced by segmenting a network.
- a) Network bandwidth
 - b) Tokens
 - c) Broadcast storms
 - d) Security
27. Which statement is not true about routers?
- a) A router can be configured to route TCP/IP traffic
 - b) A router can be used to segment a network
 - c) A router can be configured to route IPX traffic
 - d) At least one router is required on each network
28. A MSAU (Multistation Access Unit) is used on a:
- a) Thichwire coax Ethernet network
 - b) Thinwire coax Ethernet network
 - c) Token Ring network
 - d) UTP Ethernet network
29. Which of the following is true about Token Ring networks?
- a) It is possible to connect two Token Ring rings without using a router
 - b) Token Ring uses a bus topology
 - c) Token Ring networks cannot be connected to the Internet
 - d) Token Ring networks use Category 5 UTP cabling
30. Which of the following allows viewing of files on an HTTP server?
- a) FTP client
 - b) NFS client
 - c) Web browser
 - d) Novell Client32
31. In a client/server architecture, the maximum number of clients a server can process commands from is _____.
- a) 25
 - b) 100
 - c) Limited by the physical characteristics of the server such as the amount of RAM and the speed of the processor
 - d) Limited by the number of clients the server is licenced to handle.
 - e) Both C and D are true

32. Which data link protocol can support more than 200 stations on a segment?
- a) 10Base2 and 10Base5
 - b) 10BaseT and ArcNet
 - c) FDDI and 10Base5
 - d) 10BaseT and FDDI
33. Data-link layer protocols used on LANs, such as Ethernet, include functions associated with which two layers of the OSI reference model?
- a) Physical and Network
 - b) Physical and Data-link
 - c) Data-link and Network
 - d) Transport and Physical
34. What phenomenon never occurs on a properly functioning Token Ring network but is a normal occurrence on an Ethernet network?
- a) Sensing
 - b) Collision
 - c) Token passing
 - d) Frame passing
35. You have been asked to create a subnet that supports 16 hosts. What subnet mask should you use?
- a) 255.255.255.252
 - b) 255.255.255.248
 - c) 255.255.255.240
 - d) 255.255.255.224
36. If a Web server with a registered IP address can access the internet but client computers with unregistered addresses cannot, which of the following components might be the source of the problem?
- a) The CSU/DSU
 - b) The Internet access router
 - c) The proxy server
 - d) The WAN connection
37. Which of the following components is not needed for a network to run its own Internet e-mail server?
- a) A DNS server to host the domain
 - b) A registered IP address
 - c) A Web-based administration interface
 - d) A registered domain name
38. A user is unable to access an Internet Web site but can access file system shared on the same LAN. Which of the following might be the problem?
- A: The user's computer has an incorrect IP address
B: The user's computer has an incorrect default gateway address
C: The user's hub is malfunctioning
D: The router connecting the LAN to the ISP is malfunctioning
- a) B and D
 - b) B and C
 - c) A and D
 - d) A and B

39. In the IP address assignment 10.54.113.0/24, what does the number 24 represent?
- a) The number of bits in the subnet identifier
 - b) The number of bits in the host identifier
 - c) The number of bits in the combined network and subnet identifiers
 - d) The number of bits in the combined network and subnet identifiers
40. Given the mask 255.255.254.0, how many hosts per subnet does this create?
- a) 510
 - b) 256
 - c) 254
 - d) 512

SECTION B (40 marks)

Answer All Questions in the answer booklet by providing the correct answers.

For each of the following situations, specify which Ethernet variation you would recommend.

1. A legacy Category 3 UTP cable installation.

2. A high-bandwidth backbone network 1,000 meters long.

3. A Fast Ethernet LAN connecting 50 workstations in a factory environment with large amounts of electromagnetic interference.

For each of the following types of computers, specify whether it should have a registered or an unregistered IP address, or both.

4. A corporate Web server providing product information to Internet clients around the world.

5. A NAT router enabling clients on a private network to access Internet servers.

6. An Internet Web server on a private network used to provide human resources information to employees.

7. A client computer that accesses Web servers on the Internet using a NAT router.

8. A proxy server providing Internet Web access to clients on a private network.

For the IP address assignment given, specify the number of bits in the subnet identifier, the number of possible IP addresses in each subnet, the subnet mask for the IP addresses, and the IP address ranges for the first and last subnet.

172.28.0.0/24

9. Number of bits in subnet identifier:

10. Number of possible IP addresses in each subnet:

11. Subnet mask: _____

12. First subnet: _____

13. Last subnet: _____

Specify the OSI reference model layer at which each of the following devices operates.

14. MAUs _____

15. Hub _____

16. Bridge _____

17. Switch _____

18. Router _____

19. Gateways _____

20. Brouter _____

List five (5) data transmission technologies that can be used to implement any WAN.

21. _____

22. _____

23. _____

24. _____

25. _____

Name three (3) specification options available for the implementation of Gigabit Ethernet technology.

26. _____

27. _____

28. _____

Give the three main components involve in wireless communication network.

29. _____

30. _____

31. _____

Name four (4) WLAN technologies that employ radio wave frequencies for its data transmission.

32. _____

34. _____

33. _____

35. _____

Give the three (3) switching methods that can be used for data transmission.

36. _____

37. _____

38. _____

List two (2) VLAN trunking protocols associated with FastEthernet.

39. _____

40. _____

SECTION C

ANSWER *ONLY ONE* QUESTION FROM THIS SECTION

QUESTION ONE

a)

i. What is MTU?

[2 marks]

ii. Why is network segmentation a good idea when managing a large network?

[3 marks]

b)

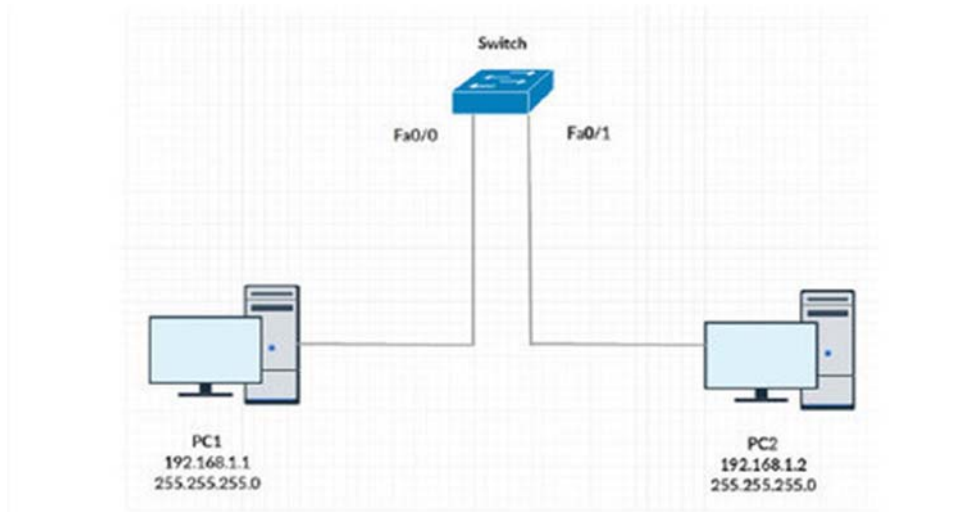
i. What is static VLAN implementing.

[4 marks]

ii. Briefly explain the conversion steps in Data Encapsulation.

[5 marks]

c)



In the above diagram two PC's with IP address 192.168.1.1 and 192.168.1.2 are connected to a layer 2 switch. Explain how PC1 will communicate with PC2?

[6 marks]

QUESTION TWO

a)

- i. What is Bandwidth in networking?

[2 marks]

- ii. Briefly explain the concept of dynamic VLAN implementation.

[4 marks]

b)

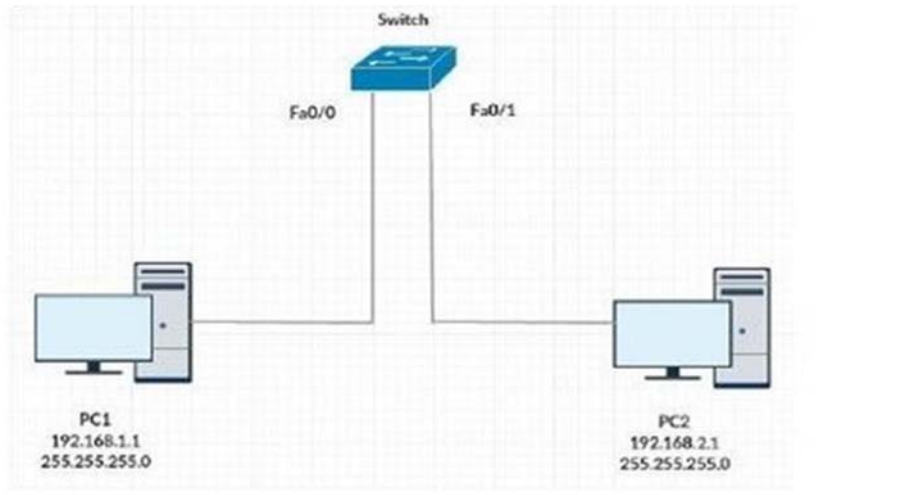
- i. What is a Spanning Tree Protocol?

[2 marks]

- ii. Given a 16-port hub and a 16-port switch. Explain the idea of a Collision domain and Broadcast domain.

[6 marks]

c)



In the above diagram two PC's with IP address 192.168.1.1, 192.168.2.1 and a subnet mask 255.255.255.0 are connected to a layer two switch. Can PC1 ping PC2? Give an explanation of your answer why **YES** or **No**.

[6 marks]

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