

2023-2024

Examination Period 2

Module: CO1507

Module CRN: 41125

Exam Type: Written

Module Title: Introduction to Networking

Module Leader: Jonathan Edwards

Examination Paper Structure This examination paper is divided into 3 sections. There are X questions in total. The mark obtainable for a question or part of a question is shown in brackets alongside the question
Students to be provided with: X answer books
Instructions to Students: The time allowed to complete this examination paper is 1 hr and 30 mins. Answer ALL questions.

Part A - Multiple Choice Questions.

1. Which of the IPv6 pair represent the correct original and shorter address?
 - a) **Original:** FD41:0000:140F:0000:0000:0000:CA5B:131B **Shorter:** FD41:0000:140F::CA5B:131B
 - b) **Original:** 20C8:0001:0002:0003:0004:0005:0006:0007 **Shorter:** 20C8:01:02:03:04:05:06:07
 - c) **Original:** FC41:0000:140F:0000:0000:0000:CA5B:131B **Shorter:** FC41:0:140F::CA5B:131B
 - d) **Original:** 2001:000A:000C:0000:0000:0005:0006:0007 **Shorter:** 2001:A:C::5:6:7

(2 marks)
2. Convert the Binary number 11011011 to Hex
 - a) CB
 - b) DB
 - c) AB
 - d) CC

(2 marks)
3. Convert the Binary number 11011011 to Decimal
 - a) 115
 - b) 219
 - c) 192
 - d) 105

(2 marks)
4. Convert the Decimal number 198 to Binary
 - a) 10101100
 - b) 01011101
 - c) 11001110
 - d) 11000110

(2 marks)
5. Which of the following statements about TCP and UDP is accurate?
 - a) TCP uses compression where UDP does not yielding greater accuracy
 - b) UDP is faster than TCP, but TCP allows for greater reliability
 - c) TCP is faster than UDP, but UDP allows for greater reliability
 - d) TCP is suitable for streaming video, and online gaming where latency is critical

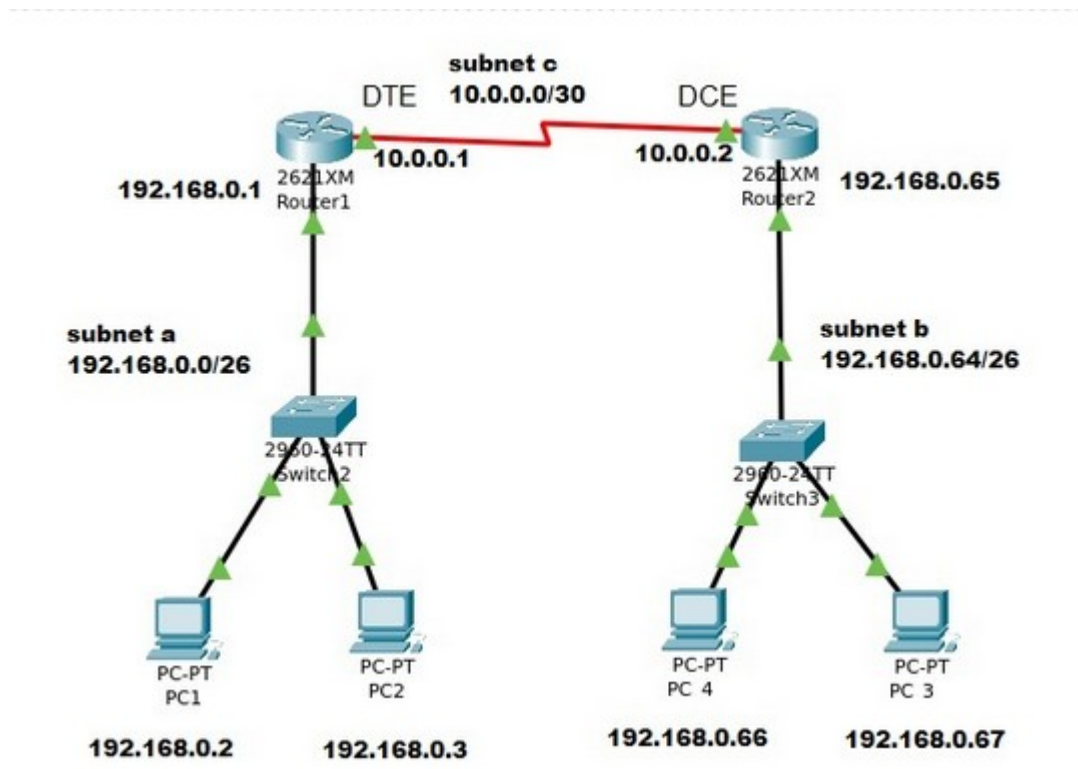
(2 marks)
6. What is the main function of DNS?
 - a) To map a known IP address to a MAC address
 - b) To translates a private IP address to a public IP address
 - c) To find the best route to the destination
 - d) To lookup the IP address for a given host name

(2 marks)

7. When DHCP has failed a Windows system will self-assign an APIPA address, which of the following is an example of such as address?

- a) 192.168.0.1
- b) 127.0.0.1
- c) 0.0.0.0
- d) 169.254.0.1

(2 marks)



8. Study the diagram above; configure a recursive static route on Router 1 (left hand side) facilitating communication with hosts on subnet B (right hand side)

- a) ip route 192.168.0.64 255.255.255.0 10.0.0.2
- b) ip route 192.168.0.1 255.255.255.192 10.0.0.1
- c) ip route 192.168.0.64 255.255.255.192 10.0.0.2
- d) ip route 192.168.0.64 255.255.255.192 s0/0

(2 marks)

9. The CIDR notation /28 corresponds to which subnet mask?

- a) 255.255.240.0
- b) 255.255.255.240
- c) 255.255.255.192
- d) 255.255.0.224

(2 marks)

10. Which of the following are functions of a router? (Select two options)

- a) Forward packets on a wide-area network
- b) Connect together hosts on a local area network
- c) Maintain routing tables
- d) Maintain ARP tables

(4 marks)

11. On Linux what would be the octal triad meaning the owner has full control, the group has read and execute but not write, and others have read only access?

- a) 742
- b) 751
- c) 754
- d) 521

(2 marks)

12. For a user with the username 'julie' where is home directory located in a Linux system?

- a) /julie
- b) /home
- c) /home/julie
- d) /julie/home

(2 marks)

13. Which of the following is a Linux terminal command to display network adaptor configuration information?

- a) ipconfig
- b) ifconfig
- c) nmap
- d) tcpdump

(4 marks)

14. What is the Linux command to list everything in the working directory including hidden files and directories?

- a) ls
- b) dir
- c) ls -l
- d) ls -a

(2 marks)

15. The two main protocols associated with the Transport layer of the OSI model are? (Select two answers)

- a) TCP
- b) ARP
- c) UDP
- d) DNS

(4 marks)

16. Which of the following is a network address? (i.e. no host ID)

- a) 192.168.0.32 /24
- b) 192.168.0.16 /26
- c) 192.168.0.32 /27
- d) 192.168.0.64 /25

(2 marks)

17. Using a custom subnet mask of 255.255.255.224 (/27) we get:

- a) 4 subnets with 62 hosts each
- b) 16 subnets with 14 hosts each
- c) 8 subnets with 30 hosts each
- d) 32 subnets with 6 hosts each

(2 marks)

18. Which of the following is a short-term solution to IPv4 address depletion? (Select 2 answers)

- a) Custom subnetting
- b) DHCP
- c) Network Address Translation
- d) ARP

(4 marks)

Part B - Fill in The Blanks

19. Fill in the missing layers on the OSI model

7 -	Application	Layer
6 -	Presentation	Layer
5 -	Session	Layer
4 -	a.)	Layer (2 marks)
3 -	b.)	Layer (2 marks)
2 -	c.)	Layer (2 marks)
1 -	d.)	Layer (2 marks)

(2 marks each. Total: 8 Marks)

20. Linux, BSD, and macOS are all _____-like operating systems.

(2 marks)

21. NAT stands for a.) _____ b.) _____ translation. It's a way to map multiple c.) _____ IP addresses inside a local network to a d.) _____ IP address before transferring the information onto the internet.

(2 marks each. Total: 8 marks)

Part C – Network Design

22. A local school is setting up four new networked computer labs. Each lab will accommodate a maximum of 50 students therefore 50 host PCs.

You have been given the network address 192.168.100.0 the default subnet mask for this address would be 255.255.255.0. You must apply a custom subnet mask in order to accommodate all four labs on separate subnets within this address space.

Calculate the following:

a.) Custom Subnet Mask

- i.) New Subnet mask (2 marks)
- ii.) CIDR Notation (1 mark)
- iii.) Max Hosts Per Subnet (1 mark)

b.) Subnet One:

- i.) Network Address (1 mark)
- ii.) First Valid Host IP Address (1 mark)
- iii.) Last Valid Host IP Address (1 mark)
- iv.) Broadcast Address (1 mark)

c.) Subnet Two:

- i.) Network Address (1 mark)
- ii.) First Valid Host IP Address (1 mark)
- iii.) Last Valid Host IP Address (1 mark)
- iv.) Broadcast Address (1 mark)

d.) Subnet Three:

- i.) Network Address (1 mark)
- ii.) First Valid Host IP Address (1 mark)
- iii.) Last Valid Host IP Address (1 mark)
- iv.) Broadcast Address (1 mark)

e.) Subnet Four:

- v.) Network Address (1 mark)
- vi.) First Valid Host IP Address (1 mark)
- vii.) Last Valid Host IP Address (1 mark)
- viii.) Broadcast Address (1 mark)

(Total: 20 marks)

23. For the following given IP address 192.168.100.72 /27 calculate:

- a.) The Subnet Mask (1 marks)
- b.) The Network Address (1 marks)
- c.) The First Valid Host IP Address (1 marks)
- d.) The Last Valid Host IP Address (1 marks)
- e.) The Broadcast Address (1 marks)

(Total: 5 marks)

24. For the following given IP address 172.16.15.100 /19 calculate:

- a.) The Subnet Mask (1 marks)
- b.) The Network Address (1 marks)
- c.) The First Valid Host IP Address (1 marks)
- d.) The Last Valid Host IP Address (1 marks)
- e.) The Broadcast Address (1 marks)

(Total: 5 marks)

25. Discuss the impact subnetting has upon the performance and security of a network
(5 marks)

26. Explain the function of the ARP protocol in the operation of a Local Area Network (LAN)
(5 marks)

Total: 100 marks