



KENYATTA UNIVERSITY
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(INFORMATION TECHNOLOGY)
SIT 113: NETWORKING

2ND SEMESTER 2023/2024

TIME: 2 HOURS

INSTRUCTIONS:

- (i) Attempt question ONE and any other TWO questions
- (ii) Use clear diagrams where necessary
- (iii) DO NOT write on the question paper

QUESTION ONE

- a) Explain any three roles of the transport layer in the TCP/IP protocol stack. (3 marks)
- b) State four functions performed by the presentation layer of the ISO OSI model. (3 marks)
- c) What is ICMP? Name a circumstance under which an end-host (not a router) will send an ICMP message.
- d) For each of the following pairs of terms, explain each term, making sure to identify the similarities (if any) and key differences between the two terms
 - i) "DNS" and "ARP" (3 marks)
 - ii) "IPv4 address" and "MAC address" (3 marks)
- e) Describe the hidden station and exposed station problem found in wireless networking. (5 marks)
- f) Briefly describe how the wireless LAN protocol CSMA/CA is able to control the hidden station and exposed station problem. (6 marks)
- g) List four advantages of using UDP over TCP. (4 marks)

QUESTION TWO

- a) Explain in detail CSMA Protocol (6 marks)
- b) State the primary differences between the link-state and distance vector routing algorithms (4 marks)
- c) Explain the difference between ARP and RARP. (4 marks)
- d) Give three benefits of 10 Gbps Ethernet over ATM. (6 marks)

QUESTION THREE

- a) Discuss any three differences between FDMA and SDMA. (6 marks)
- b) Briefly explain how the Domain Name Service (DNS) is implemented and how DNS queries are resolved in the DNS system. (5 marks)
- c) A company is contemplating whether to use a client/server or to peer to peer network. Explain any three characteristics of a peer to peer. (6 marks)
- d) Refer to the Figure 1. A technician is attempting to configure the IPv6 address 2001:db8::1111::0200 on a device. Why does the device return an error message that indicates the address is not valid? (3 marks)

The screenshot shows a network configuration window with the following elements:

- Radio button: ☐ Obtain an IPv6 address automatically
- Radio button: ☒ Use the following IPv6 address:
- Text field: IPv6 address: 2001:db8::1111::2201
- Text field: Subnet prefix length: 64
- Text field: Default gateway: (empty)
- Radio button: ☐ Obtain DNS server address automatically
- Radio button: ☒ Use the following DNS server addresses:
- Text field: Preferred DNS server: (empty)
- Text field: Alternate DNS server: (empty)
- Checkbox: ☐ Validate settings upon exit
- Button: Advanced...

An error dialog box is overlaid on the configuration window. It has a title bar with a close button (X). The dialog contains a yellow triangle with an exclamation mark icon and the text "Invalid IP address". At the bottom of the dialog is an "OK" button.

Figure 1

QUESTION FOUR

- a) Discuss key improvement that Ethernet made over Aloha. (4 marks)
- b) Explain three advantages and three disadvantages of using token rings instead of Ethernet. (6 marks)
- c) Give two reasons for using layered architecture (4 marks)

- d) Explain your understanding of IPv6. List some of its advantages over IPv4. Also, explain its frame format. (6 marks)

QUESTION FIVE

- a) Explain in detail your understanding of CSMA/CD Protocol. How does it detect collision? (5 marks)
- b) The de facto standard for wireless Local Area Network media access is the IEEE 802.11 standard. Explain why CSMA/CD is not practical for wireless networks. (3 marks)
- c) Explain the following types of transmission mode giving examples in each case
- i) Simplex (2 marks)
 - ii) Half-duplex (2 marks)
 - iii) Full-duplex (2 marks)
- d) Give the protocol stack for both OSI and TCP/IP side by side and explain the interrelationship between key layers of the models. (6 marks)