

2920/301
DATA COMMUNICATION AND NETWORKING
March/April 2023
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE III

DATA COMMUNICATION AND NETWORKING

3 hours

INSTRUCTIONS TO CANDIDATES

This paper consists of EIGHT questions.

Answer any FIVE of the questions in the answer booklet provided.

Candidates should answer the questions in English.

**This paper consists of 4 printed pages.
Candidates should check the question paper to ascertain that all the
pages are printed as indicated and that no questions are missing.**

1. (a) Explain **two** factors that should be considered when selecting an Internet Service Provider (ISP), other than cost. (4 marks)
- (b) (i) Outline **four** limitations of e-learning platforms. (4 marks)
- (ii) Paul was required to design a computer network for a client. Outline **four** guidelines that he should follow during the design stage. (4 marks)
- (c) (i) Differentiate between *2.4 GHZ* and *5.0 GHZ* Wi-Fi frequency bands. (4 marks)
- (ii) Network authentication is used to keep off unauthorized users from accessing network resources. Describe **two** types of authentications that are commonly used. (4 marks)
2. (a) (i) Outline **three** characteristics of client-server computing. (3 marks)
- (ii) Distinguish between *managed* and *unmanaged* network switches. (4 marks)
- (b) (i) Outline **three** challenges of Bluetooth communication. (3 marks)
- (ii) Patrick was required to troubleshoot a network interface card that was not showing physical connectivity. Outline **four** possible causes of the problem. (4 marks)
- (c) During the installation a computer star topology network, several components should be considered. Describe **three** such components. (6 marks)
3. (a) Explain **two** disadvantages of fibre optic cables. (4 marks)
- (b) (i) Outline **two** problems associated with token ring topology network. (2 marks)
- (ii) Distinguish between *switched virtual circuits (SVC)* and *permanent virtual connection (PVC)* as used in Frame Relay configurations. (4 marks)
- (c) Open-end Company Ltd. intends to install a data security device that has just emerged in the market. Explain **two** strategies that the company would use in order to enable its staff cope with the proposed installation. (4 marks)
- (d) Explain **three** circumstances that would necessitate the use of Challenge-Handshake Authentication Protocol (CHAP) in a WAN connection. (6 marks)
4. (a) (i) Outline **two** typical characteristics of a *Thin Ethernet* standard. (2 marks)
- (ii) Ethernet uses data encapsulation technique to facilitate data transmission from sender to receiver. Explain **two** benefits of using this technique. (4 marks)
- (b) Mercy was required to justify the decision to installing a computer network in her company. Outline **four** justifications she could have provided. (4 marks)
- (c) (i) Explain **two** advantages of getting software assurance when procuring a communication software. (4 marks)
- (ii) Paul was required to troubleshoot an email server problem within his company's network. Outline **six** causes of the problem that he could have identified. (6 marks)

5. (a) (i) Outline **two** reasons that could influence the use of ISDN in WAN connections. (2 marks)
- (ii) Distinguish between *simplex* communication and *half duplex* data communication. (4 marks)
- (b) Figure 1 shows a diagram of a fiber cable. Use it to answer the question that follows.

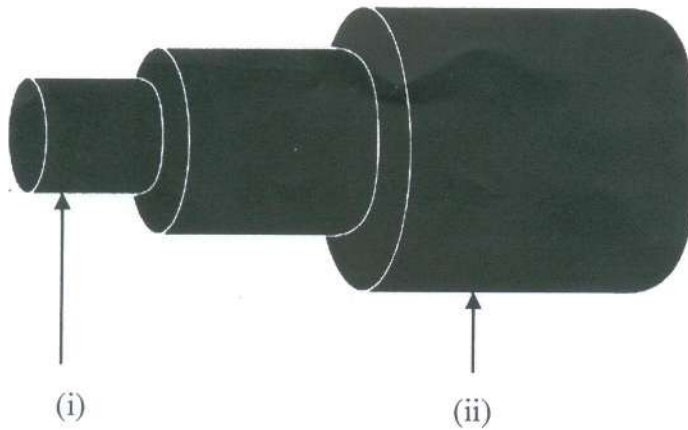


Figure 1

Describe the parts labelled (i) and (ii) (4 marks)

- (c) Maria was investigating several characteristics of a demand priority media access method. Outline **four** characteristics that she could have established. (4 marks)
- (d) OSPF creates a database that stores available link-state information of a network. Explain **three** tables that are likely to be found in the database. (6 marks)

6.

- (a) Explain **three** challenges facing both service providers and users when connecting Internet in rural areas (6 marks)
- (b) Ann intends to design an institutional network with several subnets. Outline **four** reasons that would influence her decision to use subnets. (4 marks)
- (c) Differentiate between *zero-day* and *patch* as used in computer software security. (4 marks)
- (d) UDP protocol lacks connection requirements and data verification causing issues when transmitting packets. Explain **three** possible issues. (6 marks)

7. (a) (i) Outline **four** steps used by Secure Copy Protocol (SCP) during file transfer. (4 marks)

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- (ii) Paul was required to troubleshoot an email server problem within his company's network. Outline **six** causes of the problem that he could have identified. (6 marks)

- (ii) Figure 2 shows typical tools in an Internet browser. Use it to answer the question that follows.

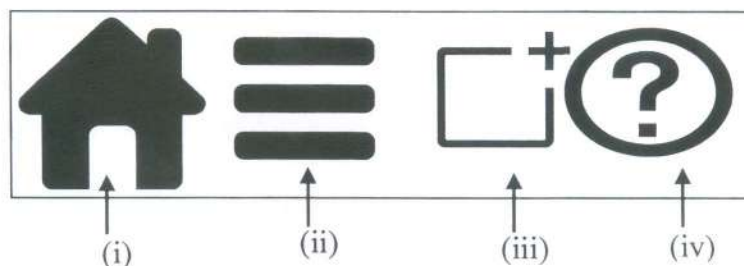


Figure 2

State the function for each of the tools labelled (i), (ii), (iii) and (iv). (4 marks)

- (b) (i) Outline **two** roles of network interface card. (2 marks)
- (ii) With the aid of a diagram, outline a data communication system. (4 marks)
- (c) (i) Outline **two** advantages of a Secure Hypertext Transfer Protocol. (HTTPS). (2 marks)
- (ii) Explain **two** circumstances under which coaxial cable would be the most appropriate when installing a computer network. (4 marks)
8. (a) Differentiate between *loopback* and *automatic private* IP addresses. (4 marks)
- (b) Explain **three** functions of session layer of the OSI Model. (6 marks)
- (c) Mark, a network support assistant, was required to test TCP/IP connection for a newly installed network in their company. Describe **three** tools that he could use to complete the task. (6 marks)
- (d) Nadia was advised to carry out a clean installation for a network operating software for her company. Outline **four** advantages of this type of installation. (4 marks)

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