

1.
  - (a) Differentiate between *collision domain* and *broadcast domain* as used in data communication. (4 marks)
  - (b) Explain **three** functions of the *data link layer* as applied in OSI model. (6 marks)
  - (c) With the aid of a diagram, describe the *TCP/IP* model. (6 marks)
  - (d) Command line network operating systems are rarely used by end users in organizations. Explain **two** disadvantages that could be affecting their popularity. (4 marks)
2.
  - (a) Outline **four** categories of communication software that could be found in computers (4 marks)
  - (b) For each of the following scenario, identify the most appropriate Internet service:
    - (i) real-time exchange of text messaging; (1 mark)
    - (ii) personal website for sharing personal opinions on a particular subject; (1 mark)
    - (iii) making digital recordings of a broadcast available for downloading; (1 mark)
    - (iv) enable people located in different geographical region to hold meetings. (1 mark)
  - (c)
    - (i) Define the term *link aggregation* as used in computer network design. (2 marks)
    - (ii) Sarah was required to identify parts of a data communication system during a job interview. Outline **four** parts that she could have identified. (4 marks)
  - (d)
    - (i) Outline **two** requirements for using file transfer protocol (FTP) in the Internet. (2 marks)
    - (ii) Explain **two** circumstances under which coaxial cables are most applicable in local area network installations. (4 marks)
3.
  - (a) Explain **three** challenges associated with installing WIFI hot spots for students use in technical institutions in Kenya. (6 marks)
  - (b) Lucas was required to select a network design for a client. Outline **four** factors that he could consider, other than cost. (4 marks)
  - (c) Differentiate between *packet filter* and *stateful inspection* firewalls as used in network security. (4 marks)
  - (d) Border Gateway Protocol (BGP) is a phenomenon protocol in transport layer. Explain **three** reasons that could be influencing its use. (6 marks)
4.
  - (a) Explain each of the following terms as used in the Internet:
    - (i) registrar;
    - (ii) domain name. (4 marks)
  - (b) Juliet was advised by her friends to use genuine licensed communication software in her company. Explain **two** reasons that could inform her friend's advice. (4 marks)
  - (c) Hackers are known to exploit email vulnerabilities to attack private networks. Outline **four** examples of such vulnerabilities that they could exploit. (4 marks)

- (d) (i) With the aid of examples, describe **two** wireless network topologies. (4 marks)
- (ii) Explain **two** advantages of using token passing as used in local area network. (4 marks)
5. (a) (i) Outline **three** limitations of a mesh network. (3 marks)
- (ii) Distinguish between *managed* and *unmanaged* network switches. (4 marks)
- (b) (i) Outline **three** factors that determines the throughput of a transmission media. (3 marks)
- (ii) A lecturer described various network troubleshooting techniques in a data communication and networking class. Outline **four** guidelines that he could have mentioned to the class. (4 marks)
- (c) The network design phase is prone to several constraints. Explain **three** typical constraints that are likely to affect organizations during this phase. (6 marks)
6. (a) Outline **two** roles of computer networks in organizations. (2 marks)
- (b) Figure 1 shows an Ethernet frame. Outline the function of each of the parts labelled (i) and (ii). (4 marks)

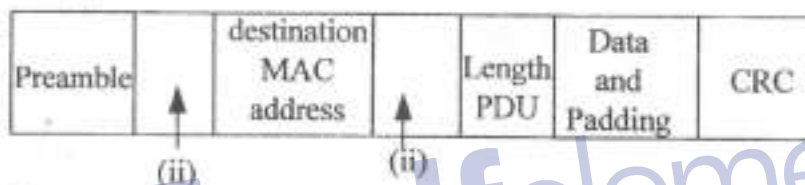


Figure 1

- (c) CSMA/CD is not commonly used in network interface card configurations. Explain **two** limitations that could be hampering its use. (4 marks)
- (d) (i) Outline **four** reasons for updating a network operating system (NOS). (4 marks)
- (ii) Liz discovered that her company network was having a problem that would require attention of their network administrator. Explain **three** typical signs that she could have discovered. (6 marks)
7. (a) Describe **two** disadvantages of using fibre optic cables. (4 marks)
- (b) (i) List **four** examples of signal impairment that could be experienced in a transmission medium. (2 marks)
- (ii) Distinguish between *Link Control Protocol* (LCP) and *Network Control Protocol* (NCP) as used in WAN. (4 marks)
- (c) Cloud computing is a technology that is being adapted by business firms. Explain **two** types of cloud computing services that could be used. (4 marks)
- (d) Explain **three** circumstances that would necessitate the installation of a frame relay WAN connection in organizations. (6 marks)

8. (a) (i) Outline **two** benefits of installing ISDN connections in organizations. (2 marks)
- (ii) Distinguish between *host-ID* and *network-ID* as used in IP addressing (4 marks)
- (b) Cyclic Redundancy Check (CRC) is an error-detecting scheme commonly used in computer networks. Outline **four** of its strengths that could be driving its popularity. (4 marks)
- (c) Satellite links are not commonly used in local area networks (LAN). Outline **four** reasons that discourage their use. (4 marks)
- (d) With the aid of a diagram, describe the User Datagram Protocol (UDP) datagram. (6 marks)

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