

2920/301
DATA COMMUNICATION
AND NETWORKING
November 2017
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 EIGHT questions in the answer booklet provided.

ALL questions carry equal marks.

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) (i) Outline **three** advantages of hybrid topology networks. (3 marks)
(ii) Distinguish between hubs and *bridges* as used in networking. (4 marks)
(b) (i) Outline **three** factors that should be considered when selecting a transmission media, other than cost. (3 marks)
(ii) Network administrators use several documents when troubleshooting a network. Describe **two** documents commonly used. (4 marks)
(c) Network design is a very important phase in networking. Explain **three** objectives to be attained by the phase. (6 marks)
2. (a) Explain each of the following terms as used in the Internet:
(i) cookies; (2 marks)
(ii) bookmark. (2 marks)
(b) John was required to install communication software for his company. Outline **four** factors that he should consider before installing the software, other than cost. (4 marks)
(c) Use of passwords promotes network security. Outline **four** precautions that should be considered when assigning passwords. (4 marks)
(d) (i) With the aid of examples, describe **two** categories of wireless networks that could be found in organizations. (4 marks)
(ii) Explain **two** characteristics of a local area network. (4 marks)
3. (a) (i) Outline **two** advantages of point to point protocol (PPP). (2 marks)
(ii) Distinguish between *broadcast* and *host IP* addresses. (4 marks)
(b) (i) With the aid of a diagram, represent the data 10110001 in the form of a digital encoded wave form. (2 marks)
(ii) Convert the digital encoded signal in (i) into on-return-to-zero (NRZ) line code. (2 marks)
(c) Copper cables are prone to several impairments when used in a network. Explain **two** types of impairments that could be experienced while using the cables. (4 marks)
(d) With the aid of a diagram, describe the User Datagram Protocol (UDP) datagram. (6 marks)
4. (a) Explain **three** Internet services that could be utilized by students in technical institutions. (6 marks)
(b) A good network design should produce a scalable network. Outline **four** ways of achieving this network objective. (4 marks)
(c) Differentiate between *symmetric* and *asymmetric* keys as used in network security. (4 marks)

- (d) Routing protocols are critical in data transmission. Explain **three** functions that likely to be performed by these protocols. (6 marks)
5. (a) Differentiate between *half duplex* and *full duplex* transmission modes. (4 marks)
- (b) Explain **three** functions of data link layer. (6 marks)
- (c) TCP /IP is known for its capability to provide reliable transportation of data packets from the source to destination. Explain **three** features of the protocol that promotes its reliable transport. (6 marks)
- (d) Network operating system is very critical in corporate networks. Explain **two** functions of the software. (4 marks)
6. (a) Describe **two** classification of fiber optic cables. (4 marks)
- (b) (i) Outline **two** applications of a CSMA/CD technology. (2 marks)
- (ii) Distinguish between *channel B* and *channel D* as used in integrated services digital network (ISDN). (4 marks)
- (c) Cloud computing is widely used in business firms. Explain **two** benefits that could be influencing the trend. (4 marks)
- (d) Explain **three** circumstances that would necessitate the installation of a point-to-point protocol in corporate networks. (6 marks)
7. (a) Outline **two** challenges of installing a peer to peer network in organizations. (2 marks)
- (b) Figure 1 shows an Ethernet frame. Outline the functions of the parts labelled (i) and (ii). (4 marks)

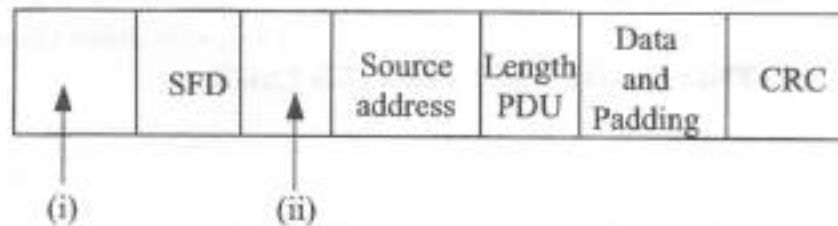


Figure 1

- (c) Susan, an intern student in a certain company discovered that the company was using a token ring network. Explain **two** advantages of the token ring network that could have influenced the company. (4 marks)
- (d) (i) Describe **two** modes of licensing for network software. (4 marks)
- (ii) Assume you are hired to troubleshoot a client's network. Explain **three** troubleshooting methods that you could consider to use. (6 marks)

8. (a) (i) Outline **four** roles of user agent as used in email software. (4 marks)
- (ii) Figure 2 shows a typical tool bar of a browser program. Outline the functions of each of the tools labelled (i), (ii), (iii) and (iv). (4 marks)

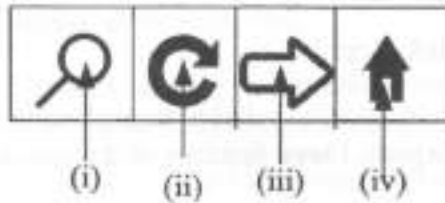


Figure 2

- (b) (i) Define the term *node* as applied in data transmission. (2 marks)
- (ii) Data communication system should exhibit distinctive features. Explain **two** desirable features that could be exhibited by the system. (4 marks)
- (c) (i) Outline **two** factors that should be considered when selecting an Internet bandwidth, other than cost. (2 marks)
- (ii) Explain **two** circumstances under which unshielded twisted pair (UTP) cables are most applicable in network installation. (4 marks)

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