2920/301
DATA COMMUNICATION AND NETWORKING
July 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.*
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.

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1. (a) Explain each of the following terms as used in the Internet:

    (i). webpage; (2 marks)

    (ii) hyperlink. (2 marks)

  (b) Peter intends to acquire communication software for his company's computer systems. Outline **four** factors other than cost that he should consider while carrying out the task. (4 marks)

  (c) Mondi Company Ltd. would like to implement encryption techniques in their network. Explain **two** types of encryption techniques that the company could consider using. (4 marks)

  (d) (i) Explain **two** methods of acquiring computer equipment. (4 marks)

    (ii) Token passing is a classic media access methods used in local area networks. Explain **two** of its strengths that could be influencing its popularity. (4 marks)

2. (a) (i) Outline **three** benefits of a client-server network model. (3 marks)

    (ii) Distinguish between a *repeater* and a *transceiver* as used in computer networks. (4 marks)

  (b) (i) Outline **three** examples of network transmission impairments. (3 marks)

    (ii) Vicky was required to use divide-and-conquer troubleshooting technique to solve a problem in a client's network. Explain **two** challenges that she could have realized while using the technique. (4 marks)

  (c) In order to carry out a network design, one is required to conduct user needs analysis. Explain **three** significances of this stage. (6 marks)

3. (a) Describe **two** types of fiber optic cables. (4 marks)

  (b) (i) Outline **two** typical characteristics of a local area network. (2 marks)

    (ii) Figure 1 shows a frame relay protocol frame. Explain the function of each of the fields labelled (i) and (ii). (4 marks)
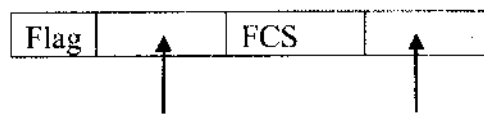
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             (i)   (ii)

Figure 1

  (c) Several organizations are cautious about using public cloud computing. Outline **four** issues that could be influencing its adoption. (4 marks)

  (d) Data encapsulation is a critical process in the transport layer of OSI. Explain **three** uses of this process. (6 marks)

4. (a) (i) Outline **two** types of multiplexing techniques. (2 marks)

    (ii) Distinguish between *broadcast* and *loopback* IP addresses. (4 marks)

  (b) Ruth intends to use unguided transmission medium for her company's network. Explain **two** limitations of this medium. (4 marks)

(c)   Quality of service majorly depends on the bandwidth of a network. Outline **four** factors that are considered when determining the bandwidth.   (4 marks)

(d)   IP is key in accessing the Internet. Explain **three** limitations characteristic of IP.
   (6 marks)

5.   (a)   Differentiate between *star* and *hybrid* network topologies.   (4 marks)

   (b)   Explain **three** functions of the session layer as used in OSI.   (6 marks)

   (c)   With the aid of a diagram, describe the TCP/IP layer model.   (6 marks)

   (d)   A network design should be properly laid out to achieve network availability. Outline **four** guidelines that should be followed to achieve this objective.   (4 marks)

6.   (a)   (i)   Outline **four** tools that could be used when troubleshooting a network. (4 marks)

       (ii)   Figure 2 shows typical tool bar of a browser program. State the function of each of the tools labelled (i), (ii), (iii) and (iv).   (4 marks)
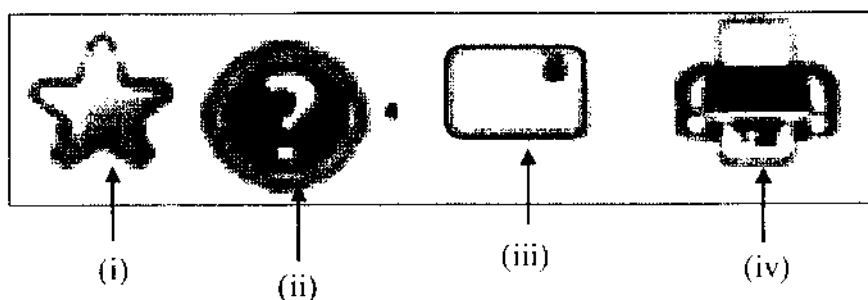

(i)   (ii)   (iii)   (iv)

Figure 2

   (b)   (i)   Define the term *channel* as applied in data transmission.   (2 marks)

       (ii)   Nancy configured a domain naming server (DNS) for her company's network. Explain **two** roles that the server would provide.   (4 marks)

   (c)   (i)   Outline **two** roles of a hub in a computer network   (2 marks)

       (ii)   Explain **two** circumstances under which a network administrator could disable SSID (Service Set Identifier) of a wireless access point.   (4 marks)

7.   (a)   Explain each of the following terms as used in the Internet:

       (i)   bookmark;   (2 marks)

       (ii)   plug-in;   (2 marks)

       (iii)   search engine.   (2 marks)

   (b)   Keith intends to propose physical security measure for a network. Outline **four** physical measures that he could have identified.   (4 marks)

   (c)   Differentiate between *malware* and *ransom ware* as applied in network security.
   (4 marks)

   (d)   Zawadi was required to select a proprietary distance vector routing protocol that would provide extremely quick convergence times with minimal network traffic.

      (i)   Identify the most appropriate routing protocol that she could prefer to use justifying your answer. (2 marks)

      (ii)   Explain **two** drawbacks of the protocol identified in (i). (4 marks)

8.   (a)   Outline **two** attributes of 10 base T Ethernet standard. (2 marks)

    (b)   For each of the following scenarios, state the appropriate transmission method:

      (i)   walkie-talkie communication; (1 mark)

      (ii)   cell phone conversation; (1 mark)

      (iii)   lecturer in a class lesson; (1 mark)

      (iv)   market selling/buying session. (1 mark)

    (c)   Miriam identified several layers of an Ethernet frame during a job appraisal. Outline the first **four** layers of an Ethernet frame that she could have identified. (4 marks)

    (d)   (i)   Distinguish between *instant messaging* and *podcasting* as applied in Internet services. (4 marks)

      (ii)   Mitambo Technical Institute installed Wireless Internet in the student's hostels. Explain **three** benefits that the students will realize from the installation. (6 marks)

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