THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE III

DATA COMMUNICATION AND NETWORKING

3 Hours
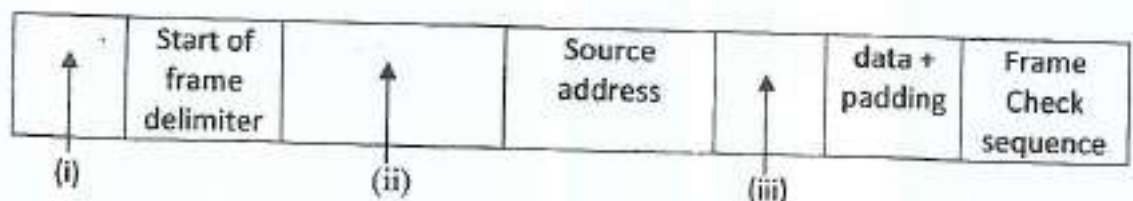
INSTRUCTIONS TO CANDIDATES

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.

Turn over

1. (a) (i)   State **two** advantages of multiplexing in data communication systems. (2 marks)

        (ii) Distinguish between frequency division multiplexing (FDM) and time division multiplexing (TDM). (4 marks)

    (b) Explain **two** types of transmission impairment. (4 marks)

    (c) Mary designed a network for her company by connecting the existing Local Area Networks to the Internet. Explain the reason for using the following hardware devices in the task:

        (i)   bridge; (2 marks)

        (ii)   router; (2 marks)

        (iii) NIC. (2 marks)

    (d) Bidii Company Ltd. is considering replacing their network cables with fibre optic cables. Outline **four** challenges that they are likely to face. (4 marks)

2. (a) Explain each of the following terms as used in *feedback-based* flow control techniques of transport protocol.

        (i)   stop-and-wait; (2 marks)

        (ii)   sliding window. (2 marks)

    (b) Distinguish between *peer-to-peer* and *client-server* networks. (4 marks)

    (c) Excel Company Ltd. uses wireless transmission media to communicate to their clients using broadcast method.

        (i)   Explain the term broadcast; (2 marks)

        (ii)   Describe **two** types of wireless transmission that could be used by the company. (4 marks)

    (d) Explain **three** circumstances that would necessitate the implementation of encryption network security system. (6 marks)

3. (a) (i)   Outline **two** components that can be used as Data Terminating Equipment in a computer network. (2 marks)

        (ii) Explain each of the following error detection methods.

            (I)   parity check; (2 marks)

            (II) cyclic redundancy check. (2 marks)

    (b) (i)   An organization that is located in ABY building has designed their network using 10 Base T Ethernet Standard. Explain **two** characteristics of *10 base T* cable in Ethernet technology. (4 marks)

        (ii) Explain **two** circumstances that would necessitate the use of Bluetooth in an office. (4 marks)

    (c) With an aid of an example in each case, explain **three** modes of data transmission. (6 marks)

4. (a) List **four** examples of Network Operating Systems. (2 marks)

(b) Tom a network designer was tasked to set a computer network for Mwangaza Technical Institute. He was provided with coaxial cable, 6 computers, 1 printer, 2 terminators and drop cables.

(i) With the aid of a diagram, design the most appropriate network topology that could have been set-up by Tom. (4 marks)

(ii) Outline **three** disadvantages of the above topology. (3 marks)

(c) Differentiate between *sign-up* and *sign-in* as used in the Internet. (4 marks)

(d) Aisha bought a communication software on a DVD which she intends to use in her computer.

(i) Explain **two** considerations to be made for the successful installation of the software. (4 marks)

(ii) Outline **three** advantages of installing the software on the computer hard disk instead of running the software directly from the DVD. (3 marks)

5. (a) Infosys Company Ltd. offers Internet services in the country using DSL connections.

(i) Outline **two** limitations of using that connection. (2 marks)

(ii) Describe **two** types that the company could have used. (4 marks)

(b) Distinguish between *CSMA/CD* and *token ring* media access methods. (4 marks)

(c) With an aid of a diagram, describe *packet switched* network. (5 marks)

(d) Assuming a 4-bit checksum system, determine the transmitted data unit for the following bits:

(i) 1011101010011010 (4 marks)

(ii) List **two** error correction techniques that could be applied in the system. (1 mark)

6. (a) (i) List **four** types of OSPF protocol routers. (2 marks)

(ii) Explain **one** function of each of the following Internet protocols:

(I) SMTP; (2 marks)

(II) FTP. (2 marks)

(b) Figure 1 shows a frame format of IEEE 802.3. Use it to answer the question that follows:

	Start of frame delimiter		Source address		data + padding	Frame Check sequence
(i)		(ii)		(iii)		

Describe the parts labelled (i), (ii) and (iii). (6 marks)

(c) Outline **four** roles of IP as used in TCP/IP. (4 marks)

(d) Salim a network administrator was troubleshooting the company's network after several complaints from the users on network congestions.

    (i) Outline **two** causes of this congestions. (2 marks)

    (ii) Suggest **two** ways of solving the problem in (i). (2 marks)

7. (a) List **four** examples of Network Operating System software. (2 marks)

  (b) Differentiate between *BCC* and *CC* as used in email programs. (4 marks)

  (c) (i) Define the following terms as used in the Internet:

      (I) hypertext;

      (II) cookie;

      (III) chat;

      (IV) website. (4 marks)

    (ii) Explain **two** uses of antivirus software. (4 marks)

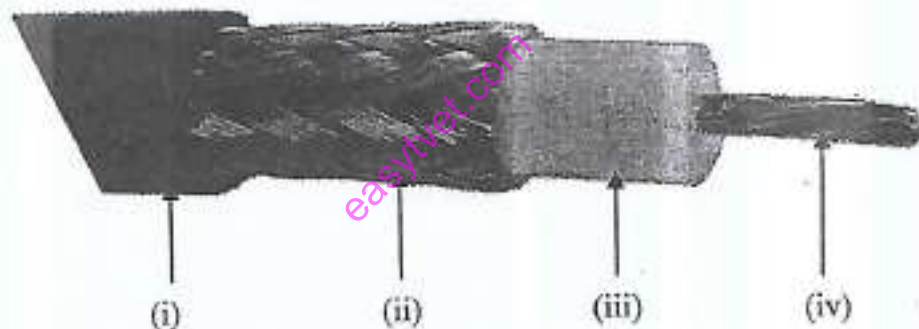 (d) Figure 2 shows a coaxial cable used for data communication. Use it to answer the questions that follow.

Figure 2

    (i) Identify the parts labelled (i), (ii), (iii) and (iv) (2 marks)

    (ii) Explain **two** challenges experienced while using the cable. (4 marks)

8. (a) List **four** examples of social sites that support real-time chat. (2 marks)

  (b) Peter intends to troubleshoot a network that has physical connectivity issues.

    (i) Outline **three** faults that may be realised. (3 marks)

    (ii) Explain **two** strategies that he could use to counter the problems. (4 marks)

  (c) A-Zed Company Ltd. distributed the newest Networking Operating System software in the market to a few of its clients for review. Unfortunately, the feedback was negative. Describe **three** technological changes causing this problem. (6 marks)

  (d) With the aid of a diagram, describe the following data transmission methods: (5 marks)

    (i) synchronous;

    (ii) asynchronous.

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