Name_____ Index No._____/_____

2920/301
DATA COMMUNICATION
AND NETWORKING
November 2015
Time: 3 hours

Candidate's Signature _____

Date_____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

DATA COMMUNICATION AND NETWORKING

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.
Sign and write the date of examination in the spaces provided above.
*Answer any **FIVE** of the following **EIGHT** questions in the spaces provided in this question paper.*
***ALL** questions carry equal marks.*
Candidates should answer the questions in English.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	Total Score
Candidate's Score									

This paper consists of 11 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) Describe the term *throughput* as used in data communication. (2 marks)

(ii) Outline **three** benefits of OSI model in data communication. (3 marks)

(b) Vincent was required to investigate the demerits of the broadcast transmission method. Outline **five** demerits that he could have established. (5 marks)

(c) (i) Outline **two** typical features of a10 BaseT network. (2 marks)

(ii) Rose intends to install a star topology in her company's network. Outline **four** factors that she should consider before the installation, other than cost. (4 marks)

(d) Network administrators are support to monitor and troubleshoot a network by use of a set of network documentation. Explain **two** types of documents that they could use. (4 marks)

2. (a) (i) Outline **two** functions of a network operating system (NOS). (2 marks)

(ii) Describe **two** components of a data communication system. (4 marks)

(b) Differentiate between bottom-up and top-down troubleshooting methods. (4 marks)

(c) A lecturer described the functions of TCP/IP protocol to a class. Outline **five** functions he could have mentioned. (5 marks)

(d) Majority of network engineers prefer to use *IP Version 6* instead of *IP version 4*. Outline **five** limitations of IP version 4 (IPV4) that could be influencing this preference. (5 marks)

3. (a) Explain each of the following type of network design:

(i) stub; (2 marks)

(ii) flat. (2 marks)

(b) (i) Differentiate between *packet switching* and *circuit switching* as used in data communication. (4 marks)

(ii) Tabitha was required to use untended installation for a certain communication program. Explain **two** disadvantages she could realize while using this method of installation. (4 marks)

(c) S24 Company Ltd. intends to incorporate several fault tolerance measures in its network design. Explain **two** measures that the company could consider. (4 marks)

(d) Frame relay is cost effective for WAN connections. Outline **four** reasons justifying this statement. (4 marks)

4. (a) (i) Outline **three** benefits of ring topology in organizations. (3 marks)

(ii) Outline **three** types of networks based on the number of devices serviced. (3 marks)

(b) Explain the following security issues of data communication systems:

(i) identity theft; (2 marks)

(ii) piracy. (2 marks)

(c) Mary was required to explain functions of a browser program in a computer during a job interview. Outline **five** functions that she could have mentioned. (5 marks)

(d) Felix intends to design a shortest path routing algorithm for a data communication system. Outline **five** goals that should drive the exercise. (5 marks)

5. (a) (i) Define the term *latency* as applied in network troubleshooting. (2 marks)

(ii) Explain **one** factor that could affect bandwidth of a transmission media. (2 marks)

(b) Differentiate between a *hub* and a *repeater* as used in computer networks. (4 marks)

(c) (i) East Company Ltd. intends to use power Ethernet technology for its proposed network. Outline **four** benefits that it could realize from this decision. (4 marks)

(ii) ISDN is still widely used for WAN connectivity. Explain **two** types that could be used in organizations. (4 marks)

(d) Jamaa Technical College intends to install Internet hotspots in all their lecturers' rooms. Explain **two** advantages of this kind of service. (4 marks)

6. (a) Explain each of the following data transfer modes in files transfer protocol:

(i) stream; (2 marks)

(ii) block; (2 marks)

(iii) compressed. (2 marks)

(b) Figure 1 shows a typical tool bar of an Internet program. Explain **two** physical resources that should be used with the feature labelled (i). (4 marks)

Figure 1

(c) Ethernet technology has continued to dominate data communication. Outline **five** of its strengths that could be aiding this trend. (5 marks)

(d) IP multicast transmission is designed to conserve the bandwidth of a network. Outline **five** examples of its application in a typical network. (5 marks)

7. (a) Outline **two** challenges of using the Internet in organizations. (2 marks)

(b) Explain **four** circumstances that would necessitate use of fibre optical cable in corporate networks. (8 marks)

(c) Differentiate between *half duplex* and *full duplex* data communication. (4 marks)

(d) Assume you are consulted by an organization to recommend the measures that it could take to mitigate emerging trends in data communication. Explain **three** measures that you could recommend. (6 marks)

8. (a) (i) List **four** categories of twisted copper wire that could be used in building networks. (2 marks)

(ii) Differentiate between *symmetric* and *asymmetric* encryption as applied in data security. (4 marks)

(b) Data security measures require consultation with all stakeholders in organization. Explain **two** logical security measures that could be incorporated in a data communication even without consultation. (4 marks)

(c) (i) Explain the term *access layer* as applied in network design. (2 marks)

(ii) TCP is considered a reliable transport protocol. Outline **four** basic operations that promote its reliability. (4 marks)

(d) For each of the following scenario, identify the appropriate communication software:

(i) sharing private information with friends; (1 mark)

(ii) sending assignments to a lecturer; (1 mark)

(iii) sending short messages to a workmate; (1 mark)

(iv) sending monthly price catalogue to clients. (1 mark)

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