

2209/302
DATA COMMUNICATION
June/July 2012
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION TECHNOLOGY

MODULE III

DATA COMMUNICATION

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;
Scientific calculator.

Answer any FIVE of the following EIGHT questions.

All questions carry equal marks.

Maximum marks for each part of a question are as indicated.

This paper consists of 6 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) State four components of a data communication system. (2 marks)
- (b) A group of module III students in a certain college were carrying-out an assignment on OSI model. Explain **three** benefits that they might have identified. (6 marks)
- (c) Differentiate between FDM and TDM multiplexing scheme as used in data communication. (4 marks)
- (d) (i) Outline **two** types of switching technologies that could be used in a circuit switching network. (2 marks)
- (ii) Jane, a network engineer would like to implement data security in a network. Explain **three** data security techniques that she could use. (6 marks)
2. (a) (i) Outline **two** reasons for encoding signals during data transmission. (2 marks)
- (ii) Outline **two** data transmission impairments. (2 marks)
- (b) (i) Explain **two** advantages of virtual private networks. (4 marks)
- (ii) Differentiate between distributed and centralized computer networks. (4 marks)
- (c) The following are characteristics of particular network topologies:
- I. Has a backbone cable with high bandwidth.
 - II. Easily scalable.
 - III. Has a mechanism of reducing echoing.
- (i) State the type of topology. (1 mark)
- (ii) Explain the media access method used in the type of topology identified in (i). (3 marks)
- (iii) Explain **two** disadvantages of the topology identified in (i). (4 marks)
3. (a) State **two** strategies that could be used to prevent each of the following Internet insecurities:
- (i) Spamming; (2 marks)
 - (ii) Phishing. (2 marks)

- (b) Figure 1 shows a digital signal. Use it to answer the question that follows.

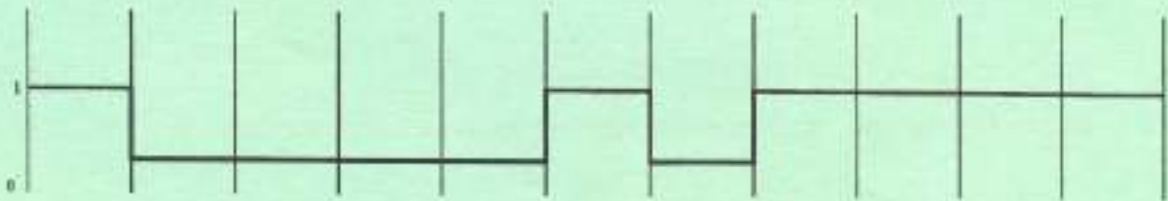


Fig. 1

Assuming that the signal is to be transmitted, draw the line code for each of the following encoding schemes:

- (i) Manchester; (2 marks)
- (ii) Differential Manchester (2 marks)
- (c) Explain **three** reasons for not implementing CSMA/CD on a wireless LAN's. (6 marks)
- (d) Mary recently bought a desktop computer, which she intends to connect to the Internet using the local area network. Explain the procedure she could use. (6 marks)
4. (a) Explain **two** characteristics of a WAN as used in data communication. (4 marks)
- (b) Differentiate between FQDN and PQDN as used in the Internet. (4 marks)
- (c) For each of the following protocols identify the most appropriate port number.
- (i) SMTP (1 mark)
- (ii) TELNET (1 mark)
- (iii) HTTP (1 mark)
- (iv) FTP (1 mark)
- (d) (i) During a data communication lesson in a certain college, a teacher mentioned about various internet regulatory bodies. Outline **four** internet regulatory bodies that are likely to have been mentioned. (4 marks)

- (ii) A certain ISP company was contemplating on introducing data routing services to their clients. Assuming you been hired as a network consultant, outline four types of routing you would recommend. (4 marks)

5. (a) (i) State **four** examples of communication software. (2 mark)
 (ii) Outline **two** applications of fibre cables in data communication. (2 marks)

(b) Explain the following terms as used in the Internet:

- (i) URL; (2 marks)
 (ii) Portal. (2 marks)

(c) Differentiate between predecessor and a successor hosts in data communication. (4 marks)

(d) ABC Company Ltd intends to install Internet services. Explain **four** benefits that the company is likely be realize. (8 marks)

6. (a) Zawadi Company Ltd intends to install an ISDN. Assuming you have been hired as a network consultant, Explain **three** types of ISDN interfaces you could recommend. (6 marks)

(b) Differentiate between half-duplex and full-duplex configuration as used in data communication. (4 marks)

(c) Figure 2 shows network topologies using token passing for a media access, Identify the topology labeled (i), (ii), (iii), (iv). (4 marks)

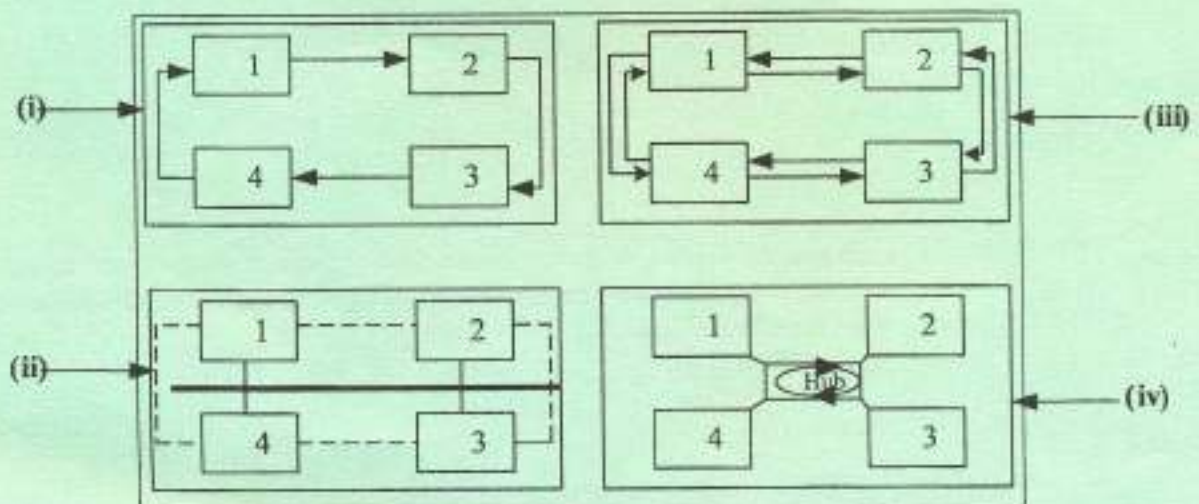


Fig. 1

- (d) Paul, a network administrator enabled cookies while configuring browser on a computer. Explain **three** reasons that could have influenced his action. (6 marks)

7. (a) Outline one data communication device that uses each of the following interfaces:
- (i) RS 485 (1 mark)
 - (ii) X.25 (1 mark)
 - (iii) RS 423 (1 mark)
 - (iv) V.22 bus (1 mark)

- (b) Figure 3 shows OSI model. Explain the function of the layers labeled (i) and (ii). (4 marks)

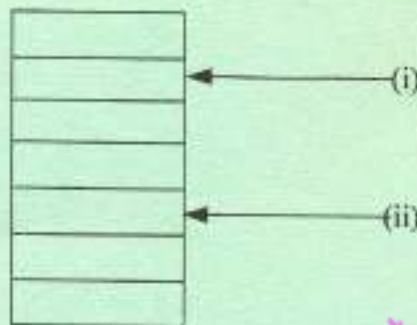


Fig. 3

- (c) Differentiate between bridge and a router as used in computer networks. (4 marks)
- (d) With the aid of a diagram, describe 802.3 frame as used in data communication. (8 marks)
8. (a) Explain each of the following terms as used in error detection and control:
- (i) Hamming distance. (2 marks)
 - (ii) Linear block code. (2 marks)
- (b) Peter intends to setup a local area network in his cyber cafe. Outline **five** factors that he could consider other than cost. (5 marks)
- (c) The following data stream is to be transmitted through a system that uses CRC for error detection and correction. Assuming that the system uses x^3+x+1 as the polynomial generator, determine the CRC code that will be used to transmit the data. (5 marks)

11010011101100

- (d) (i) Outline **two** advantages of ATM switching over ISDN switching. (2 marks)
- (ii) A group of Module III students were carrying out assignment on network security. Outline **four** network vulnerabilities they might have identified. (4 marks)

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