



DICT LEVEL II

COMPUTER NETWORKING

MONDAY: 17 May 2021.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

QUESTION ONE

(a) Distinguish between each of the following pairs of terms:

- (i) "Single mode fibre optic cable" and "multi mode fibre optic cable". (4 marks)
- (ii) "Broadband internet connection" and "dial up internet connection". (4 marks)
- (b) Highlight two common applications of wireless data communication in daily life. (2 marks)
- (c) Mr Ochieng, a lab technician, used a bridge to connect two different networks with different architectures in order to allow for resource sharing. However, the network failed.

Required:

- (i) Identify the reason why the network failed. (2 marks)
- (ii) When connecting segments, bridges determine the network segment that a Media Access Control (MAC) address belongs to by using either transparent bridging or source route bridging.

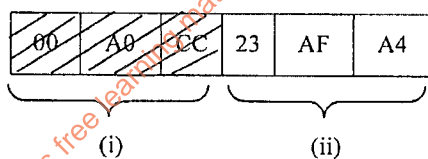
Compare the two types of bridging mentioned above.

(8 marks)

(Total: 20 marks)

QUESTION TWO

(a) A network adapter is identified by a unique 6-byte MAC address as shown in the example below:



Required:

- Citing the purpose in each case, identify the group of bytes represented by (i) and (ii) above. (4 marks)
- (b) Explain the following protocols as used in computer networking:
 - (i) Password Authentication Protocol (PAP). (2 marks)
 - (ii) Challenge Handshake Authentication Protocol (CHAP). (2 marks)
 - (iii) Dynamic Host Configuration Protocol (DHCP). (2 marks)

- (c) Flooding and routing are the two commonly used techniques to transmit data over the mesh network topology.
Explain how each of the above techniques work in aiding transmission of the connected nodes. (4 marks)
- (d) Determine three properties, other than size, which differentiate a Local Area Network (LAN) from a Wide Area Network (WAN). (6 marks)
- (Total: 20 marks)**

QUESTION THREE

- (a) Differentiate between the following pairs of terms as used in data transmission:
- (i) "Modulation rate" and "baud rate". (2 marks)
 - (ii) "Bandwidth" and "throughput". (2 marks)
 - (iii) "Baseband" and "broadband" signals. (2 marks)
- (b) Highlight two types of a Network Operating System (NOS). (2 marks)
- (c) The use of computer networks in organisations might bring challenges. As a Network Administrator, you will therefore need to understand these challenges and come up with mitigation measures.

Required:

Citing a mitigation measure in each case, explain the nature of the following network challenges:

- (i) IP address and NIC address problem. (4 marks)
 - (ii) No network access due to firewall restriction. (4 marks)
 - (iii) Slow network speed while accessing network resources. (4 marks)
- (Total: 20 marks)**

QUESTION FOUR

- (a) "Computer networks support complete usage of computing resources in areas where computers are used".
With reference to the above statement highlight four merits of computer networks. (4 marks)
- (b) In order to implement networking solutions, the Open System Interconnection (OSI) model uses a layered approach.
Describe any five of the seven layers of OSI. (10 marks)
- (c) Explain each of the following types of computer networks:
- (i) Virtual WLAN. (2 marks)
 - (ii) SAN. (2 marks)
 - (iii) VPN. (2 marks)
- (Total: 20 marks)**

QUESTION FIVE

- (a) Discuss five advantages of IPv6 over IPv4. (10 marks)
- (b) Citing five reasons, justify the use of a peer-to-peer network over a client server network. (10 marks)
- (Total: 20 marks)**
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