Universiti Tun Hussein Onn Malaysia

# UNIVERSITI TUN HUSSEIN ONN MALAYSIA

## FINAL EXAMINATION
## SEMESTER I
## SESSION 2019/2020

| | | |
|---|---|---|
| COURSE NAME | : | COMPUTER NETWORK |
| COURSE CODE | : | BNF 32203 |
| PROGRAMME CODE | : | BNF |
| EXAMINATION DATE | : | DECEMBER 2019 / JANUARY 2020 |
| DURATION | : | 2 HOURS 30 MINUTES |
| INSTRUCTION | : | ANSWER **ALL** QUESTIONS |



THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

**Q1** (a) Differentiate between Unicast communication and Multicast communication network types.

(2 marks)

(b) Illustrate the computer network topology as specified below.

(i) Ring topology
(ii) Tree topology
(iii) Mesh topology
(iv) Bus topology

(4 marks)

(c) Open System Interconnection (OSI) reference model has seven layers and each layer has its own function. Explain **TWO (2)** functions of the layers listed below.

(i) Transport layer
(ii) Network layer

(4 marks)

(d) Differentiate between the Open System Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) reference models.

(4 marks)

(e) List **FOUR (4)** types of computer network.

(4 marks)

(f) Describe the different between Intranet and Internet.

(2 marks)

**Q2** (a) Differentiate between Client-server and Hybrid of client-server and Peer-to-peer application architecture.

(4 marks)

(b) Demonstrate the similarity and differences between Hypertext Transfer Protocol (HTTP) and File Transfer Protocol (FTP).

(4 marks)

(c) State **THREE (3)** major components for electronic mail in internet. List **THREE (3)** important differences between Hypertext Transfer Protocol (HTTP) and Simple Mail Transfer Protocol (SMTP).

(6 marks)

(d) Demonstrate FTP client to server connection protocol.



(4 marks)

(e) Differentiate between HTTP persistent and HTTP non-persistent connections.

(2 marks)

**Q3** (a) A Wide Area Network (WAN) has a network mask of 255.0.0.0/8 and subnet mask of 255.255.224.0/19. One of the host IP address is 14.56.25.87. Due to shortage of IP address, subnet mask is used.

Formulate the major network information for:

(i) Major network address
(ii) Major network broadcast address
(iii) Range of host if not subnetted

Formulate the subnet information for:

(iv) Subnet address
(v) Range of host addresses (first host and last host)
(vi) Broadcast address
(vii) Total number of subnets
(viii) Number of hosts per subnet

(9 marks)

(b) Design a Variable Length Subnet Mask (VLSM) solution for network in **Figure Q3(b)**. The given IP address from the network administrator is 192.168.10.0/24.

(i) Formulate the IP addresses for each link.
(ii) Formulate the range of host (IP address) of all Local Area Network (LAN).

(11 marks)

**Q4** (a) IP fragmentation in network layer is used to divide oversized IP packet into smaller packets set by the Maximum Transfer Packet (MTU). Refer to **Figure Q4(a)**, one large datagram packet of 7,400 bytes arrived at a router and it has been forwarded to a link with an MTU of 1,550 bytes. Note that the TCP header is 20 bytes for each fragment.

(i) Formulate the fragments forwarded through the link
(ii) Generate the Offset number and Flag number of each fragment

(8 marks)

(b) Explain the function of Multiplexing and De-multiplexing in the transport layer.

(4 marks)

(c) Illustrate the User Datagram Protocol (UDP) segment structure.

(4 marks)



(d) As an application developer, you are required to choose either to use User Datagram Protocol (UDP) or Transmission Control Protocol (TCP). Select and justify your transport protocol selection.

(4 marks)

**Q5** (a) Reliable data transfer (RDT) has three consideration. Explain RDT1.0.

(2 marks)

(b) Differentiate between Go-Back-N and Selective Repeat (SR) error recovery approach.

(4 marks)

(c) User Datagram Protocol (UDP) checksum provides error detection for the protocol. Generate the checksum in binary number for the following four 8-bit words.

| | | |
|---|---|---|
| 1st word | : | 01110110 |
| 2nd word | : | 01010111 |
| 3rd word | : | 00110101 |
| 4th word | : | 10101110 |

(4 marks)

(d) Generate Binary Encoding and Manchester Encoding for bit stream as below.

001011101100

(4 marks)

(e) Differentiate between Parity Checks error detection and Cyclic Redundancy Check (CRC) error detection in Data Link layer.

(2 marks)

(f) Define Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM) in Data Link layer.

(2 marks)

(g) Illustrate the Ethernet frame structure.

(2 marks)

**- END OF QUESTIONS -**

**FINAL EXAMINATION**

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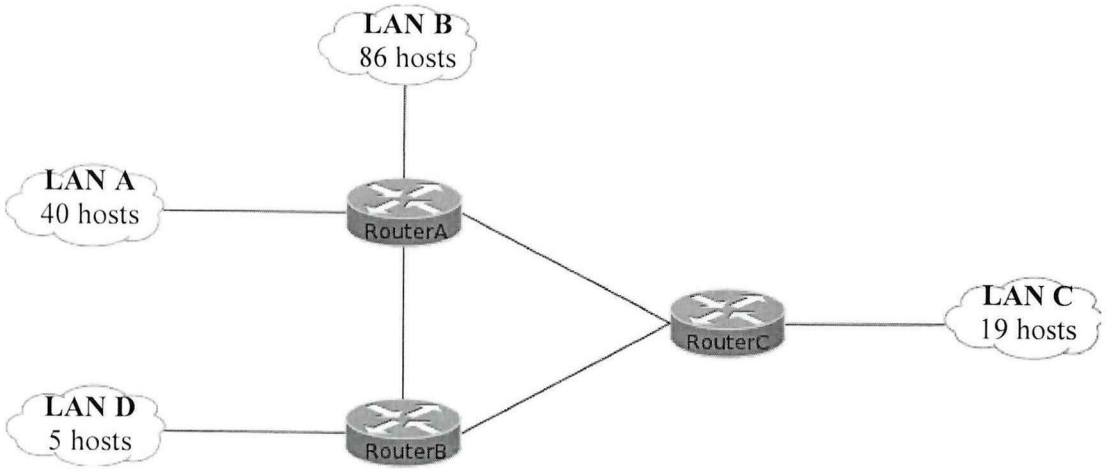


**Figure Q3(b)**

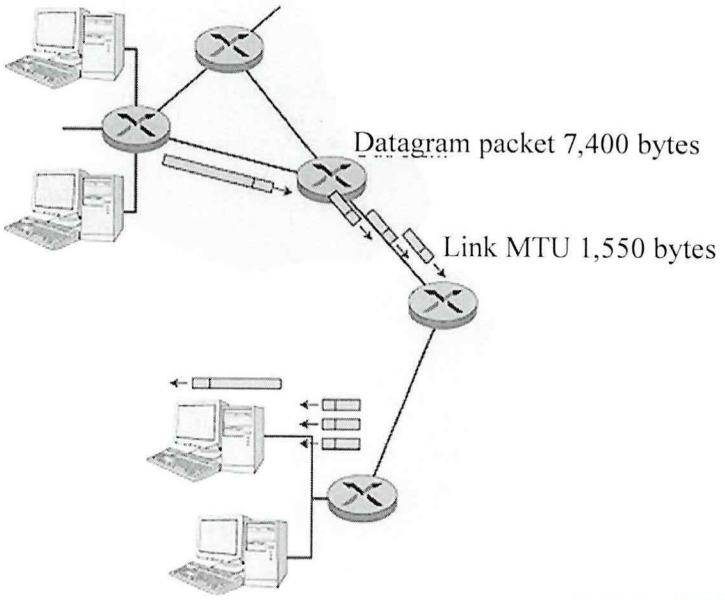


**Figure Q4(a)**