

- (b) Consider sending a 3000 byte datagram into a link that has an MTU of 500 bytes. Suppose the original datagram is stamped with identification number 422. How many fragments are generated? What are their characteristics?

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8. (a) What is hamming distance? What kind of error cannot be detected by hamming code? Explain with an example. What is Hamming distance between 100101 and 111001?

(b) Mention the difference between traditional Ethernet and Fast Ethernet. Explain different types of Ethernet used in setting up a LAN.

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Qn. Set Code-1

Semester: 5th
Programme: B.Tech
Branch: CSE, IT, CSCE, CSSE

ANNUAL SUPPLEMENTARY EXAMINATION-2024

5th Semester B.Tech

COMPUTER NETWORKS

IT 3009

Time: 2 Hours 30 Minutes Full Marks: 50

(For 2022 (L.E), 2021 & Previous Admitted Batches)

Question paper consists of four SECTIONS i.e. A, B, C and D.

Section A is compulsory.

Attempt minimum one question each from Sections B, C, D.

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.*

SECTION-A

1. Answer the following questions:

[1 × 10]

- (a) Specify the role of a proxy server in an organization? What are the pros and cons of this?
- (b) If flow and error control are performed at the data link layer, then why is it also necessary to perform flow and error control at the transport layer?
- (c) State how connection less protocol differs from connection oriented protocol.
- (d) How throughput is improved in slotted ALOHA as compared to pure ALOHA?
- (e) Is the layering architecture is needed? If yes then Justify.
- (f) In Stop-and-Wait ARQ, the sequence numbers are based on modulo-2 arithmetic. Why?
- (g) Suppose a process in Host C has a UDP socket with port number 6789. Suppose both Host A and Host B

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each send a UDP segment to Host C with destination port number 6789. How will the process at Host C know that these two segments originated from two different hosts?

- (h) Describe at least two reasons, why an application developer preferred UDP rather than TCP.

- (i) A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle?
- (j) Mention the destination IP address used in a packet for limited broadcast. Specify an application layer protocol that uses this limited broadcast address for its functionality.

SECTION-B

2. (a) List all the layers in OSI hierarchy and discuss their functions. Why such hierarchical approach to networking is utilized. Compare OSI Model with TCP/IP reference model

- (b) List the message types of ICMP protocol and explain the various function of the messages associated with the protocol.

[4]

6. (a) Explain how CRC is used in detecting errors for the polynomial, $g(x)=x^4+x+1$. Consider the information sequence 1101011011.
 I) Find the codeword.
 II) If the code word has error in third bit, what does receiver obtain when it does error checking?

- (b) What do you mean by congestion control? Explain the methods involved in TCP slow start to avoid congestion control.

[4]

3. (a) An organization has a class C network 196.10.10.0 and wants to form subnets for five departments which will have 55, 50, 45, and 25 hosts. Find the Subnet mask, Subnet ID and range of IP addresses
 (b) Explain Addressing and Channel access control mechanism for Ethernet LAN.

[4]

4. (a) Briefly explain the working of an E-mail Application with the help of neat block diagram showing functional

blocks like UA, MTA, MAA, Mail-Box, Message-Queue

- (b) Explain Distance vector routing algorithm along with its limitation and how it has been overcome.

5. (a) Distinguish between a time-out and 3-duplicate ACKs event. Which one is a stronger sign of congestion in the network? Explain the reason behind the same through an appropriate example

- (b) Two hosts A and B, are separated by 20,000 kilometers and are connected by a direct link of $R = 2 \text{ Mbps}$ with a propagation speed over the link of $2.5 \times 10^8 \text{ meters/sec}$. Consider sending a file of 800,000 bits from Host A to Host B. What is the maximum number of bits that will be in the link at any given time?

[4]

7. (a) With the help of flow diagram explain how the following frames are handled in Go-Back N ARQ with neat sketch.
 a) A corrupted data frame
 b) A corrupted ACK frame

[4]

SECTION-D

SECTION-C

4. (a) Briefly explain the working of an E-mail Application with the help of neat block diagram showing functional

[4]