# Question Paper

Exam Date & Time: 04-May-2024 (02:30 PM - 05:30 PM)

## MANIPAL ACADEMY OF HIGHER EDUCATION

**SIXTH SEMESTER B.TECH. (ELECTRONICS AND COMMUNICATION ENGINEERING) DEGREE EXAMINATIONS - APRIL / MAY 2024**
**SUBJECT: ECE 3251/ECE_3251 - COMMUNICATION NETWORKS**

**Marks: 50** **Duration: 180 mins.**

**Answer all the questions.**

1A) Explain in detail the following network connecting devices (4)
i) Network Interface Cards
ii) Bridge
iii) Switch
iv) Router

1B) Discuss the two methodologies adopted to calculate the data rate of a channel. Determine the appropriate bit rate and signal level for a channel with 1 MHz bandwidth and SNR as 63. (3)

1C) With suitable diagram analyse the 3 phases of circuit switching. (3)

2A) Form the codeword for the transmitting data stream 1001011011001 using CRC if the generator bit stream is 10010. (4)

2B) Calculate the checksum for the following IPv4 packet. (3)

<table>
<tr><td>0x4</td><td>0x5</td><td>0x02</td><td colspan="2">$54_{10}$</td></tr>
<tr><td colspan="3">9D0E</td><td>$010_2$</td><td>$0000000000000_2$</td></tr>
<tr><td>$128_{10}$</td><td colspan="2">0x06</td><td colspan="2">8B4A</td></tr>
<tr><td colspan="5">128.143.137.145</td></tr>
<tr><td colspan="5">128.143.71.121</td></tr>
</table>

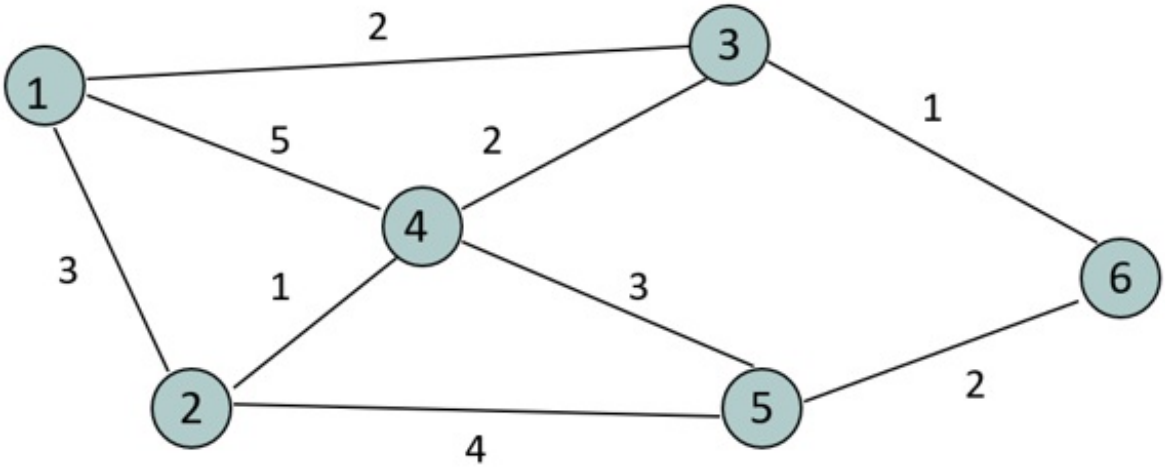
2C) On a 50Mbps satellite channel with 250msec delay, frames are transmitted with each of size 10KB. Compute the link utilization using the following ARQ techniques: Stop-and-Wait, Go-back-N, and Selective-Repeat with window size of 5 and error probability of $10^{-4}$. (3)

3A) A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces (4)
i) 1000 frames per second
ii) 500 frames per second
iii) 250 frames per second.

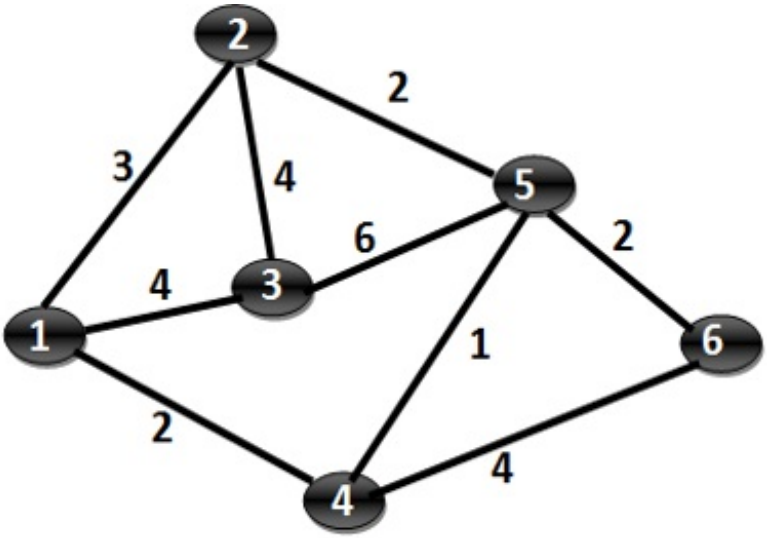
3B) In a CSMA/CD LAN of 2 km using copper wire running at 100 Mbps, what would be the minimum frame size to hear all collisions? (3)

3C) With a suitable diagram illustrate the FDDI frame structure. (3)

4A) Use Bellman-Ford algorithm to find cost of the shortest paths from all the nodes to node '6' before and after the link failure between nodes 3 and 6 in the following subnet. (4)




4B) Perform distance vector routing algorithm on the following subnet and compute the routing table maintained at node '3'. (3)




4C) Discuss the IPv6 header format with neat diagram. (3)

5A) Explain the TCP header format and explain each field in detail. (4)

5B) Draw the browser architecture of WWW and brief the types of WWW documents with suitable diagrams. (3)

5C) Mention the steps in mapping a host name to an IP address using DNS. (3)

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