

National Institute of Technology, Delhi

Name of the Examination: B. Tech. Mid Semester

Branch: ECE

Semester: 7th

Title of the Course: Computer Networks

Course Code: EC405

Time: 2 Hours

Maximum Marks: 30

All Questions are Compulsory.

- Q. 1. a) What is topology? State advantages and disadvantages of mesh and bus topologies.
b) What is the need for switching? Compare and contrast circuit switching and message switching. State one application area for each of these methods.
c) What is transmission impairment and what are its causes?
d) What is baseline wandering? How does it effect data communication?
e) How the concept of hamming distance is useful for error detection?
f) What is the length of bit in a channel with a propagation speed of 2×10^8 m/s if channel bandwidth is (i) 10 Mbps (ii) 1 Gbps.
g) Distinguish between synchronous and asynchronous transmission.
h) What are the advantages and disadvantages of delta modulation?
i) Distinguish between baseband and broadband transmission. Explain whether sending a digital signal from one station on a LAN to another station is baseband or broadband?
[1×10]
- Q. 2. a) What is framing? Why framing is done? What are the types of framing? Explain in detail.
b) Why we need both IP and MAC addresses?
[2×2]
- Q. 3. a) State Shannon's channel capacity theorem. A line has a SNR of 2000 and 5000 khz. What is the maximum data rate supported by this line?
b) An analog signal has a bit rate of 8000bps and baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements are needed?
[2×2]
- Q. 4. a) Calculate the baud rate for the given bit rate and type of modulation
o 3000bps, FSK
o 2000bps, ASK
o 4000bps, QPSK
b) What is DSL? Explain ADSL, HDSL and VDSL.
[3+1]
- Q. 5. a) Explain step by step the process of creation of hamming ode for the given data word 110001011101001001111.
b) For a given code word 111110001100 (assuming it was created using even parity hamming code) indicate whether it is correct or not. If incorrect indicate
(i) which bit positions are in error?
(ii) what the correct code word should have been?
(iii) the original data word.

[2+3]

- Q.6. a) Find out the code word to be transmitted using CRC if the data word is 11001 and divisor is 101.
b) Use following line coding schemes to convert the digital data string 11000000001101000011110 into digital signals

NRZ-L

Differential Manchester

AMI

HDB3 (assume number of nonzero pulses is odd after last substitution)

[1+2]