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**MANIPAL INSTITUTE OF TECHNOLOGY**  
(Constituent Institute of Manipal University)  
MANIPAL-576104



**FIFTH SEMESTER B.E. (CSE) DEGREE END SEMESTER EXAMINATION**  
**NOV/DEC 2011**

**COMPUTER COMMUNICATION AND NETWORK (CSE 309)**

**DATE: 07-12-2011**

**TIME: 3 HOURS**

**MAX.MARKS: 50**

- Answer **any five** full questions.

- 1A. Draw and Explain the OSI Reference Model.
- 1B. A CRC is constructed to generate 4 bit FCS for an 11 bit message. The generator polynomial is  $X^4+X^3+1$ .
- a. Draw the shift register circuit that would perform this task.
  - b. Encode the data bit sequence 10011011100 using the generator polynomial and give the code word.
- 1C. Suppose that a synchronous serial data transmission is clocked by two clocks that each has a drift of 1 minute in 1 year (one at sender and one at receiver). How long a sequence of bits can be sent before possible clock drift could cause a problem? **(5+(2+1)+2)**
- 2A. What do you mean by interlacing? Explain in detail with the required diagram and example.
- 2B. Suppose a digitalized TV picture is to be transmitted from a source that uses a matrix of 480 x 500 pixels, where each pixel can take on one of 32 intensity values. Assume that 30 pictures are sent per second. Find the source rate R(bps). Assume that TV picture is to be transmitted over a channel with 4.5MHZ bandwidth and 35dB SNR. Find the capacity of the channel.
- 2C Find the period of the function  $f(t)=(10\cos t)^2$  **(5+3+2)**
- 3A. Explain the two wireless LAN Protocols and discuss the problems for which these protocols were developed.
- 3B Explain Static Channel Allocation in LAN's and MAN's.
- 3C Measurements of a slotted ALOHA channel with an infinite number of users show that 10 % of the slots are idle.

a. What is the Channel load G?

b. What is the throughput?

c. Is the channel underloaded or overloaded?

(5+3+2)

4A. For the bit stream 01001110, sketch all the 6 encoding techniques. Assume that signal level for the preceding bit for NRZI was high, the most recent preceding 1 bit has a negative voltage and the most recent preceding 0 bit has a negative voltage. Discuss the advantages and disadvantages of the techniques.

4B. What is crosstalk? How is it minimized in case of twisted-pair of wire?

4C. NRZL signal is passed through a filter with  $r=0.5$  and then modulated on to a carrier. The data rate is 2400 bps. Evaluate the bandwidth for ASK and FSK (two frequencies used are 50 kHz and 55 kHz)

(5+3+2)

5A. Explain the following with diagrams and give the reason for their chosen maximum window size.

a. Selective Reject ARQ

b. Go-Back N ARQ

5B Explain how frequency division multiplexing works with a neat diagram.

5C Two stations communicate via 1Mbps satellite link with a propagation delay of 270ms.

The satellite serves nearly to retransmit data received from one station to another with negligible switching delay. Using HDLC frames of 1024 bits with 3 bit sequence number, what is the throughput of data bits carried in HDLC Frames?

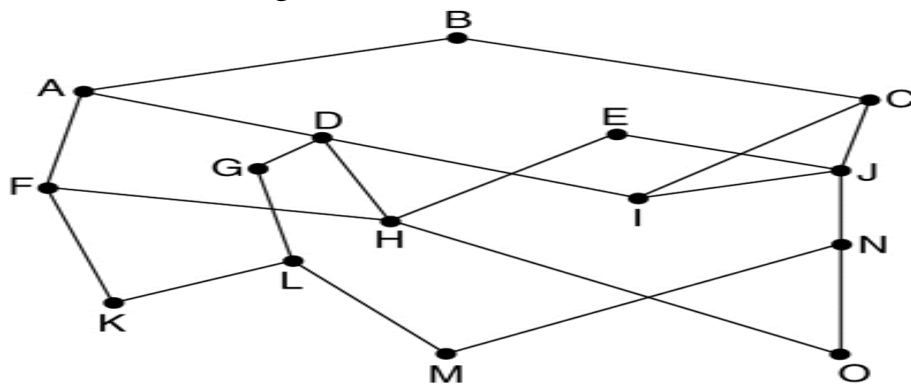
(5+3+2)

6A Explain in brief Routing for Mobile hosts. How Congestion Control is handled in Datagram Subnets?

6B Looking at the subnet of the following figure, how many packets are generated by a broadcast from B, using

a. Reverse Path Forwarding

b. Sink Tree



6C Telephone line is known to have a loss of 20 dB. The input signal power is measured as 0.5W, and the output noise level is measured as 4.5 microwatt. Using this information, calculate the output signal-to-noise ratio in dB.

((2+3)+3+2)