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



**FIFTH SEMESTER B.E. (CSE) DEGREE END SEMESTER EXAMINATION**  
**JAN. 2012**  
**COMPUTER COMMUNICATION AND NETWORKS (CSE 309)**  
**DATE: 04-01-2012**

**TIME: 3 HOURS**

**MAX.MARKS: 50**

- Answer **any five** full questions.

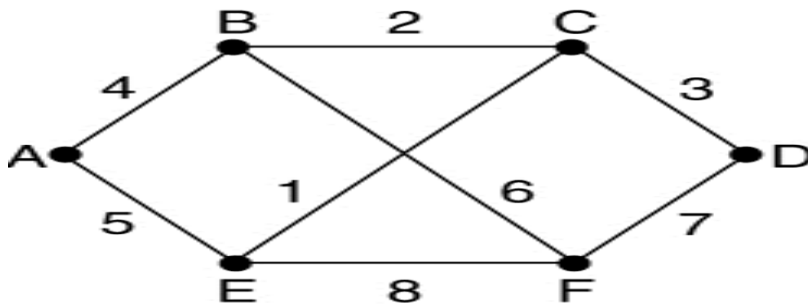
- 1A Brief about the critics of TCP/IP and OSI Model.
- 1B Explain Asynchronous Transmission. Show the effect of timing error in the same.
- 1C Would you expect that the inclusion of a parity bit with each character would change the probability of receiving a correct message? Justify your answer. **(5+3+2)**
- 2A Illustrate the relationship between data rate and bandwidth with different cases.
- 2B Both Shannon and Nyquist place an upper limit on the bit rate of a channel based on two different approaches. How are the two related? Explain.
- 2C A digital signaling system is required to operate at 9600 bps. If a signal element encodes 8 bit word, what is the minimum required bandwidth of the channel? **(5+3+2)**
- 3A 3A. Explain the following for 802.11 Standard
  - a. Frame Structure
  - b. Services
- 3B Explain the five key assumptions required to formulate the Dynamic channel allocation problem.
- 3C A large population of ALOHA users manage to generate 50 requests per second including both originals and retransmissions. Time is slotted in units of 40ms
  - a. What is the chance of success on the first attempt?
  - b. What is the probability of exactly k collisions and then success?
  - c. What is the expected number of transmissions attempts needed? **((2+3)+3+2)**
- 4A For the bit stream 01001100011 sketches all the 6 encoding techniques. Assume that signal level for the preceding bit for NRZI was low, 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 Draw the diagram depicting single mode and multi-mode fiber. Why single-mode fibers are used for long distance communications rather than multi-mode fibers?
- 4C Assume that telephone line channel is equalized to allow band pass data transmission over a frequency range of 600 – 3000 Hz. The available bandwidth is 2400 Hz. For  $r=1$  evaluate the required bandwidth for 2400 bps QPSK and 4800 bps, 8 level multilevel signalling. Is the bandwidth adequate? **(5+3+2)**
- 5A Explain the HDLC Frame Structure in detail. Mention the concept of Bit Stuffing.
- 5B Explain how synchronous time division multiplexing works with diagram.
- 5C Write Line utilization as a function of  $P$ , the probability that a single frame is in error for the following ARQ error control techniques.
- Stop and Wait.
  - Go-Back N with  $W=7$ .
  - Selective Reject with  $W=127$ .

Do all of the preceding for the following values of  $a$  : 1 and 100 **((4+1)+3+2)**

- 6A Explain in brief about Link State Routing Algorithm. How Congestion Control is handled in Virtual Circuit Subnets?
- 6B Consider the subnet of the given figure. Distance vector routing is used, and the following vectors have just come in to router C from B: (5,0,8,12,6,2); from D: (16,12,6,0,9,10); and from E: (7,6,3,9,04). The measured delays to B, D and E are 6,3 and 5 respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.



- 6C What are the three different approaches used in Statistical TDM Frame Formats to minimize the bit overhead. **((3+2)+3+2)**

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