CS4514
Computer Networks C02
Mid-Term Review

I. Introduction
  A. Definitions
    1. network vs distributed system
    2. classify networks
      a. transmission technology - broadcast, multicast, point-to-point
      b. size - LAN, MAN, WAN
      c. topology - star, ring, tree
    3. performance measures
      a. throughput
      b. utilization
      c. response time
      d. end-to-end delay
        i. processing delay
        ii. queueing delay
        iii. transmission delay
        iv. propagation delay
  B. Elementary TCP Sockets
    1. Client/server model
    2. structure of sockaddr_in
    3. socket functions
      a. *socket*
      b. *connect*
      c. *bind*
      d. *listen*
      e. *accept*
      f. *close*
  C. Seven Layer ISO OSI Reference Model
  D. Layering Examples
    1. IP addresses
    2. HTTP example with Web browsing {TCP example}
    3. DNS example {UDP example}

II. Miscellaneous topics before physical layer
  A. Multiplexing ***{Note – multiplexing was covered just before PCM in the Physical Layer section}***
    1. TDM
    2. FDM
    3. statistical multiplexing {concentrator}
  B. Switching
    1. circuit switching
    2. message switching
    3. packet switching

C. Store-and-Forward Networks
   1. virtual circuit networks
   2. datagram networks
   3. connectionless versus connection-oriented networks

III. Physical Layer
A. Definitions
   1. baud {modulation rate}
   2. data rate {capacity}
   3. bandwidth
   4. voice-grade line
B. Nyquist Theorem
   1. signal constellations
C. Shannon's Result
   1. signal-to-noise ratio
   2. decibel definition
D. Analog vs Digital
   1. data
   2. signals
   3. transmissions
   4. attenuation
   5. amplifiers vs repeaters
   6. modem
   7. codec
   8. advantages vs disadvantages
E. Data Encoding Techniques
   1. digital data, analog signals
      a. ASK
      b. FSK
      c. PSK
   2. digital data, digital signals
      a. NRZL
      b. NRZI
         i. differential codes
      c. Bi-phase codes
         i. Manchester
         ii. differential Manchester
   3. analog data, digital signals
      a. PCM
      b. T1 carrier
      c. delta modulation
F. Transmission Media
   1. twisted pair
      a. UTP Cat 3,4, 5
      b. DSL

2. Coaxial cable
   a. baseband
      i. 10BASE2
      ii. 10BASE5
   b. broadband {CATV}
   c. comparison
3. Optical Fiber

IV. Data Link Layer
A. Synchronous vs asynchronous transmissions
   1. bit, character, block level
B. Framing
   1. bit stuffing
   2. byte stuffing
C. Transmission Errors
   1. error detection and error correction
   2. Hamming distance
   3. CRC
      a. polynomial code
      b. generating function G(x)
      c. CRC algorithm
D. Tanenbaum's DL protocols
   1. Utopia
   2. Stop-and-Wait {introduce ACKs}
   3. PAR {noisy channel}
      a. old version
         1. ACK, timer, duplicate frames
      b. new version
   4. sliding window protocols {intro only}

----------**only up to here !!** ----------

      a. Go BACK N
      b. Selective Repeat