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B TECH
(SEM-VII) THEORY EXAMINATION 2018-19
DATA COMMUNICATION NETWORKS

Time: 3 Hours *M Marks: 100*
Note: Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION-A

1. Attempt all of the following questions: **(10×2=20)**

(a) What do you mean by space division multiple accesses?
(b) Describe link budget analysis?
(c) What are the impacts on communication channel for varying a SNR?
(d) Write the expression for phase and frequency modulated wave.
(e) What is the role of signal vector in MIMO system?
(f) State the fundamental concept of OFDM?
(g) Briefly discuss point to point protocol (PPP)?
(h) Describe the concept of FDDI.
(i) What do you understand by error control?
(j) In a token ring network the transmission speed is 10 bps and the propagation speed is 200 meters/μs. Calculate length of cable for 1 bit delay.

SECTION-B

2. Attempt any three of the following questions: **(3×10=30)**

(a) What is communication system? Give an overview of communication system model.
(b) Explain signal space representation. Describe the geometrical representation of signal waveform using Gram-Schmidt orthogonalization procedure.
(c) What do you mean by frequency modulation? Explain the concept of narrowband FM and wideband FM.
(d) Define various protocol used in wireless LAN.
(e) What are various IEEE standards used for networking? Explain IEEE standard 802 for LAN.

SECTION – C

3. Attempt any one of the following questions: **(1×10=10)**

(a) (i) Discuss Ethernet in brief. Also, explain binary back-off algorithm.
(ii) Define and explain the various frame type in HDLC.
(b) How do we say collision detection is analog process? Why do we prefer CSMA over ALOHA? Prove that maximum efficiency of ALOHA is 1/e.

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4. **Attempt any one of following questions:** (1×10=10)

(a) Compare FDMA, TDMA and CDMA in detail.

(b) (i) Why is the channel throughput doubled in slotted ALOHA compared to pure ALOHA?

(ii) Describe the modulation and demodulation in an OFDM system.

5. **Attempt any one of following questions:** (1×10=10)

(a) Define MAC layer of data link layer. Discuss CSMA and CSMA/CA random access method.

(b) Explain the meaning of the following terms relating to the CSMA/CD medium access control method:

(i) Broadcast mode

(ii) Collision and carrier sense.

6. **Attempt any one of following questions:** (1×10=10)

(a) (i) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is X^3+1. Show the actual bit string transmitted. Suppose the third bit from left is inverted during transmission. Show that this error is detected at the receiver end.

(ii) Explain in brief about bridges, repeaters, and gateways.

(b) (i) A channel has a bit rate of 4 Kbps and propagation delay of 20 msec. For what range of frame sizes does stop and wait gives an efficiency of at least 50%.

(ii) What do you mean by deterministic and stochastic signals?

7. **Attempt any one of following questions:** (1×10=10)

(a) (i) Seven bit Hamming code as received is 1111101. Check if it is correct or not. Find the correct code if even parity is used.

(ii) Explain in detail the matched filter receiver for AWGN channels.

(b) Describe source coding. Explain Shannon-Fano coding and Huffman coding.

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