



INTERNATIONAL CENTRE FOR APPLIED SCIENCES (Manipal University) IV SEMESTER B.S. DEGREE EXAMINATION –MAY 2016 SUBJECT: COMPUTER COMMUNICATION AND NETWORKS (CS 248) (BRANCH: COMPUTER ENGG) 23RD MAY, 2016

Time: 3 Hours

Max. Marks: 100

✓ Answer ANY FIVE full Questions.

- 1A. With a diagram explain OSI reference model for Computer Networks.
- 1B. Differentiate between NRZ-L and NRZ-I encoding techniques.
- 1C. Four channels are multiplexed using TDM. If a channel sends 100 bytes/s and we multiplex 1 byte per channel, find the frame size, the duration of a frame, the frame rate and bit rate for the link.

(10+6+4)

- 2A. Explain different types of stations, link configurations and data transfer modes used in HDLC.
- 2B. For the bit stream 01001110, Sketch the waveform in NRZ-L, NRZI and Bipolar AMI.
- 2C. We have a channel with 4 KHz bandwidth. If we want to send data at 100 Kbps, what is the mini6mum SNRdB? What is SNR?

(10+6+4)

- 3A. What is framing? With examples explain bit stuffing and byte stuffing framing techniques used in data link layer.
- 3B. A CRC is constructed to generate a 4-bit FCS for message M = 11100011 and pattern P=110011. Calculate the CRC.
- 3C. What is fixed routing? With random routing, only one copy of the packet is in existence at a time. Nevertheless, it would be wise to utilize a hop count field. Why?

(10+6+4)

- 4A. Assume CSMA/CD protocol. Find the minimum frame length for a 1Mbps bit rate and maximum network span of 10Km with no repeaters. Assume a medium of propagation delay of 4.5 nanoseconds/m. Is CSMA/CD a reasonable protocol for a network of this span and bitrate?
- 4B. Differentiate between Go back N and Selective repeat protocols.
- 4C. What is the channel capacity for a tele-printer channel with a 500-Hz bandwidth and a signal-to-noise ratio of 3 dB, where the noise is white thermal noise?

(10+6+4)

- 5A. Explain any five types of digital encoding techniques with examples.
- 5B. Given a channel with an intended capacity of 40 Mbps, the bandwidth of the channel is 3 MHz. Assuming white thermal noise, what signal-to-noise ratio is required to achieve this capacity?
- 5C. Mention the key advantages and disadvantages of circuit switching technique.

(10+6+4)

- 6A. What do you mean by adaptive routing algorithm? Explain routing by flooding which is a non-adaptive routing.
- 6B. An NRZ-L signal is passed through a filter with r = 0.5 and then modulated onto a carrier. The data rate is 2400 bps. Evaluate the bandwidth for ASK and FSK. For FSK assume that the two frequencies used are 60 KHz and 65 KHz.
- 6C. How the inefficiency of Stop-and-Wait protocol is overcome in sliding window protocol?

(10+6+4)

- 7A. Explain in brief any two approaches to congestion control.
- 7B. List and briefly define some of the requirements for effective communications over a data link.
- 7C. Given a receiver with an effective noise temperature of 294 K and a 10-MHz bandwidth, what is the thermal noise level at the receiver's output in dbW?

(10+6+4)

- 8A. Explain ALOHA and slotted ALOHA considering low load. Which is efficient? Justify
- 8B. Differentiate between frequency division and time division multiplexing.
- 8C. What is an isotropic antenna? What is the advantage of a parabolic reflective antenna?

(10+6+4)

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