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

V SEMESTER B.TECH. (COMPUTER SCIENCE AND ENGINEERING) DEGREE
END-SEMESTER EXAMINATION- JANUARY 2015 (MAKEUP)
SUBJECT: COMPUTER COMMUNICATION AND NETWORKS (CSE 311)
DATE: 04-01-2015

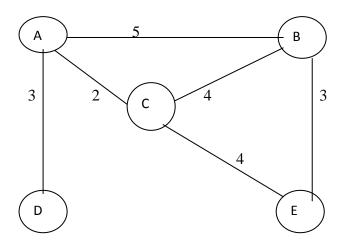TIME: 3 HOURS   MAX.MARKS: 50

Instructions to Candidates
- Answer **any five** full questions.

1.A. Explain the relationship between the data rate and bandwidth in a communication channel with suitable examples.

1.B. Define the terms (i) Protocol (ii) Peers in ISO OSI reference model.

1.C. What are the functions performed in the presentation layer of OSI model.   (6+2+2)

2. A. Describe the construction of optical fiber transmission media and its working principle with neat diagrams.

2.B. Explain, what you do mean by analog and digital transmission. Also explain why digital transmission is preferred over analog transmission.   (3+7)

3.A. Cyclic redundancy check (CRC) is employed for error detection. The message to be transmitted is M=1001 and the divisor used is P=1011.

   (i)   What are the size of the FCS and the size of the transmitted frame?
   (ii)   Draw the shift register circuit that generates the FCS and write the table to show that at the receiver, it will results in all 0's in case of no errors.

3.B. What is the bandwidth efficiency for FSK, PSK for a bit error rate of 10^{-7} on a channel with an SNR of 12dB? Assume E_b/N_0 for FSK= 14.2 dB and for PSK E_b/N_0 =11.2 dB.

3.C. Encode the given data 10010010000 in bipolar and pseudoternary AMI and state the reason why it is not efficient when compared to NRZ scheme.   (5+2+3)

4.A. Draw a neat diagram of QPSK modulator and write the equation which represents the output signal from the modulator.

4.B. (i) HDLC protocol uses a procedure known as bit-stuffing. Explain why this procedure is used.
   (ii)   Suppose that the following data pattern is to be transmitted in the information field of an HDLC frame. Determine the content of the information field after bit stuffing.
           11111111111101111110111111110

4. C. Consider the use of 2000 bit frames on a 1 Mbps satellite channel with a 250 ms propagation delay. Determine the maximum link utilization for each of the following cases:

      (i)   Stop-and-wait flow control.
      (ii)   Sliding-window flow control with a window size of 7.
      (iii)   Stop-and-wait ARQ, assuming the bit error rate of 10^{-4}.   (2+4+4)

5.A. Assume CSMA/CD protocol. Find the minimum frame length for a 1Mbps bit rate and maximum network span of 10 kilometers with no repeaters. Assume a medium propagation delay of 4.5 nanoseconds per meter. Is CSMA/CD a reasonable protocol for a network of this span and bitrate?

5.B. Explain Interframe spacing in 802.11 with neat diagram and give its importance.

5.C. Differentiate between Ethernet 802.3 standard and wireless 802.11 standard with respect to channel access protocol used.   (2+6+2)

6.A. Explain in brief the Load shedding and Random early detection (RED) methods of congestion control in networks.

6.B. Explain distance vector routing with respect to the network figure Q.6.B given below. Also write the routing table at each node. Also mention the desirable properties which any routing algorithm should have.   (4+6)

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