



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Fifth Semester, B.E. - Computer Science and Engineering**

**Semester End Examination; Dec - 2017 / Jan - 2018**

**Data Communications**

Time: 3 hrs

Max. Marks: 100

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- 1 a. List and explain five service primitives for implementing a simple connection oriented service. 10
- b. With the help of a neat diagram, explain star topology and mesh topology. List any two advantages and disadvantages of the star and mesh topology. 10
- 2 a. What are the functions of Transport, Network and Data link layer? 12
- b. What is the propagation time and transmission time for a 2.5 kb message, if the bandwidth of the network is 1Gbps? Assume that the distance between sender and receiver is 12,000 km and propagation speed is  $2.4 \times 10^8$  m/s. 8

### UNIT - II

- 3 a. List and explain different line coding techniques. 10
- b. Suppose that a signal has twice the power as a noise signal that is added to it. Find the SNR in decibels. Repeat if the signal has 10 times the noise power?,  $2^n$  times the noise power?,  $10^k$  times the noise power? 10
- 4 a. An Audio digitizing utility in a PC samples an input signal at a rate of 44 kHz and 16 bits/sample. How big a file is required to record 20 seconds? 8
- b. With a neat diagram, explain optical transmission system. 12

### UNIT - III

- 5 a. The CRC is calculated using the following generator polynomial:  $x^8 + x^2 + x + 1$ . Find the CRC bits, if the GFC, VPI, Type and CLP fields are zero, and the type VCI field is 00000000 00001111. Assume the GFC bits correspond to the highest order bits in the polynomial. 10
- b. An 8-bit byte with binary value 10101111 is to be encoded using an even-parity Hamming code. What is the binary value after encoding? 6
- c. What is the remainder obtained by dividing  $x^7 + x^5 + 1$  by the generator polynomial  $x^3 + 1$ ? 4
- 6 a. Discuss the two dimensional parity check and the types of error it can and cannot detect. 10
- b. With a neat diagram explain the structure of Hamming encoder and decoder. 10

Contd...2

**UNIT - IV**

- 7 a. In stop-and-wait ARQ why should the receiver always send an acknowledgement message each time it receives a frame with the wrong sequence number. 10
- b. Compare and contrast byte stuffing and bit stuffing. Which technique is used in byte oriented protocols? Which technique is used in bit oriented protocols. 10
- 8 a. Compare the operation of stop-and-wait ARQ with bidirectional Go-Back-N ARQ with a window size of 1. Sketch out a sequence of frame exchanges using each of these protocols. 12
- b. Tabulate the difference between HDLC and PPP protocols. 8

**UNIT - V**

- 9 a. Suppose that the ALOHA protocol is used to share a 56 kbps satellite channel. Suppose that frames are 1000 bits long find the maximum throughput of the system in frames/second. 8
- b. Describe frame format for IEEE 802.3 MAC frame with a neat diagram. 12
- 10 a. Discuss the differences between wired and wireless LAN. Using IEEE 802.3 and IEEE 802.11. 8
- b. With neat diagram, explain token frame format and data frame format of token ring protocol. 12

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